SELECTED WATER RESOURCES ABSTRACTS

VOLUME 8, NUMBER 4
FEBRUARY 15, 1975

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WATER RESOURCES ABSTRACTS

A Semimonthly Publication of the Water Resources Scientific Information Center,
Office of Water Research and Technology, U.S. Department of the Interior

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The Secretary of the U. S. Department of the Interior has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through August 31, 1978.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

FOREWORD

Selected Water Resources Abstracts, a semimonthly journal, includes abstracts of current and earlier pertinent monographs, journal articles, reports, and other publication formats. The contents of these documents cover the water-related aspects of the life, physical, and social sciences as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water. Each abstract includes a full bibliographical citation and a set of descriptors or identifiers which are listed in the **Water Resources Thesaurus.** Each abstract entry is classified into ten fields and sixty groups similar to the water resources research categories established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

WRSIC IS NOT PRESENTLY IN A POSITION TO PROVIDE COPIES OF DOCUMENTS ABSTRACTED IN THIS JOURNAL. Sufficient bibliographic information is given to enable readers to order the desired documents from local libraries or other sources.

Selected Water Resources Abstracts is designed to serve the scientific and technical information needs of scientists, engineers, and managers as one of several planned services of the Water Resources Scientific Information Center (WRSIC). The Center was established by the Secretary of the Interior and has been designated by the Federal Council for Science and Technology to serve the water resources community by improving the communication of water-related research results. The Center is pursuing this objective by coordinating and supplementing the existing scientific and technical information activities associated with active research and investigation program in water resources.

To provide WRSIC with input, selected organizations with active water resources research programs are supported as "centers of competence" responsible for selecting, abstracting, and indexing from the current and earlier pertinent literature in specified subject areas.

Additional "centers of competence" have been established in cooperation with the Environmental Protection Agency. A directory of the Centers appears on inside back cover.

Supplementary documentation is being secured from established discipline-oriented abstracting and indexing services. Currently an arrangement is in effect whereby the BioScience Information Service of Biological Abstracts supplies WRSIC with relevant references from the several subject areas of interest to our users. In addition to Biological Abstracts, references are acquired from Bioresearch Index which are without abstracts and therefore also appear abstractless in SWRA. Similar arrangements with other producers of abstracts are contemplated as planned augmentation of the information base.

The input from these Centers, and from the 51 Water Resources Research Institutes administered under the Water Resources Research Act of 1964, as well as input from the grantees and contractors of the Office of Water Research and Technology and other Federal water resource agencies with which the

Center has agreements becomes the information base from which this journal is, and other information services will be, derived; these services include bibliographies, specialized indexes, literature searches, and state-of-the-art reviews.

Comments and suggestions concerning the contents and arrangements of this bulletin are welcome.

Water Resources Scientific Information Center
Office of Water Research and Technology
U.S. Department of the Interior
Washington, D. C. 20240

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IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 5D.
W75-01896

2. WATER CYCLE

2A. General

GENERAL REPORT,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 6A.
W75-01651

COMPARISON OF THE RESULTS OF A COMPUTER CALCULATION OF WATER EXCHANGE OF THE AERATION ZONE AND GROUNDWATERS WITH LYSIMETRIC OBSERVATIONS, (IN RUSSIAN),
For primary bibliographic entry see Field 7C.
W75-01760

STUDY OF THE REGULATIONS OF INLAND WATER FORMATION AND RUNOFF IN AN INLAND WATER BAY WITH PERVIOUS GROUND, (BELVIZKELETKEZES ES LEVONULAS TORVENYSZERUSEGEINEK VIZSGALATA VIZATERESZTO TALAJU BELVIZOBLOZETBEN),
G. Molnar.
Hidrologiai Kozlony, Vol 54, No 1, p 15-20, January, 1974. 6 fig, 2 tab, 7 ref.

Descriptors: *Model studies, *Groundwater, *Runoff, Precipitation, Canals, Measurements, Pervious soils(Atmospheric).
Identifiers: Hungary, Pervious ground, Drain canal density.

A black box system model of an inland water area with pervious ground in Hungary is described on the basis of systematic groundwater level and runoff measurements. The inland water formation in plain areas with pervious ground was found to be determined primarily by the groundwater level. The general system model also contains such factors as precipitation, trickling, evapotranspiration, and flow conditions in the drain canal. In plain areas with pervious ground, the increase of the drain canal density was found to lead to increased inland water volume due to the increased runoff surface area available for the groundwater. (Takacs-FIRL)
W75-01763

HYDRAULIC PROBABILISTIC CALCULATION METHOD FOR THE DETERMINATION OF THE SEAM KARST WATER YIELD, (HIDRAULIKAI-VALOSZINUSEGELMELETI SZAMITASI MODSZER A FEKUBOL FAKADO KARSZTVIZ HOZAMANAK MEGHATAROZASARA),
A. Schmieder.
Banyaszati es Kohaszati Lapok, Vol 107, No 3, p 172-183, 1974. 7 fig, 2 tab, 24 ref.

Descriptors: *Hydrologic aspects, *Karst, Equations, Pressure, Aquifers, Turbulence, *Water yield.
Identifiers: Depth dependent water pressure.

General relationships characterizing the spontaneous karst water yield in seams were derived from hydraulic-probalistic calculations. A quadratic relationship between the karst water yield and the depression was established. The effect of protective layers can not be determined from water yield measurements. The water yield is proportional to the surface area of the opened-up field and to the square root of the turbulent depression occuring in the cracked rock, and is reduced by simultaneity. The individual yields are determined by a cross-section area of the cracks connecting the mine space with the aquifers and by the depth-dependent water pressure rather than by the paths formed in the karst aquifers. (Takacs-FIRL)
W75-01764

DISTRIBUTION OF PRECIPITATION IN MOUNTAINOUS AREAS, VOLUME 1.
For primary bibliographic entry see Field 2B.
W75-01961

OROGRAPHIC INFLUENCES ON DISTRIBUTION OF PRECIPITATION; PHYSIOGRAPHICAL FACTORS AND HYDROLOGICAL APPROACHES,
International Hydrological Decade, Bratislava (Czechoslovakia). Czechoslovak National Committee.
For primary bibliographic entry see Field 2B.
W75-01964

MODELING OF STOCHASTIC-DETERMINISTIC HYDROLOGIC SYSTEMS,
Monash Univ., Clayton (Australia). Dept. of Civil Engineering.
E. M. Laurenson.
Water Resources Research, Vol 10, No 5, p 955-961, October 1974. 5 fig, 6 tab, 3 ref.

Descriptors: *Hydrologic systems, *Stochastic processes, *Hydrologic models, *Flood frequency, *Unit hydrographs, Storage, Tides, Analytical techniques, Streamflow, Flood peak, Model studies.
Identifiers: *Stochastic-deterministic system, Matrix multiplication.

Most hydrologic systems have both stochastic and deterministic components. The stochastic components are parameters defined by means of probability distributions, whereas the deterministic components are processes that can be modeled mathematically or graphically without probabilistic statements. Combined modeling of the stochastic and deterministic aspects of systems can lead to advances in many areas of hydrologic practice. Such modeling is achieved by matrix multiplication of a probability distribution of the stochastic system input with a transitional matrix derived from the deterministic operation of the system and any stochastic parameter. This method was demonstrated for a wide range of applications. The method does not help to define the deterministic relations among variables nor the probability distributions of variables. It does provide a convenient means of mixing the deterministic and the stochastic aspects of systems. (Singh-ISWS)
W75-01977

VERIFICATION OF NUMERICAL MODELS OF LAKE ONTARIO: PART I. CIRCULATION IN SPRING AND EARLY SUMMER,
Canada Centre for Inland Waters, Burlington (Ontario).
For primary bibliographic entry see Field 2H.
W75-01987

A TECHNIQUE USED TO DETERMINE RANDOM POINT POSITION,
Central and Southern Florida Flood Control District, West Palm Beach. Water Planning Div.
For primary bibliographic entry see Field 7B.
W75-01988

EXPERIMENTAL EXAMINATION OF THE RATIONAL METHOD FOR SMALL RURAL CATCHMENTS,
New South Wales Univ., Kensington (Australia). School of Civil Engineering.
R. French, D. H. Pilgrim, and B. E. Laurenson.
Civil Engineering Transactions, The Institution of Engineers, Australia, Vol CE16, No 2, p 95-102, 1974. 9 fig, 2 tab, 24 ref, appendix.

Descriptors: *Rational formula, *Peak discharge, *Rainfall-runoff relationships, *Small watersheds, Watersheds(Basins), Time of concentration, Design flow, Mathematical models, Statistical methods, Hydrographs, Frequency analysis, Estimating equations, Design data, *Australia.
Identifiers: *New South Wales(Aust).

In order to test the validity of the Rational Method of flood estimation as a design procedure for small rural catchments, two different but often confused interpretation of the method are distinguished. The formula may be regarded as a deterministic mathematical model of the rainfall-runoff process, yielding predictions of peak runoff rates from particular rainfall events. Examination of published data from catchments in the U.S. shows that three ciritical hypotheses derived from this interpretation are not supported, and thus that the method provides an inadequate description of the way in which a catchment modifies rainfall to produce runoff. The alternative interpretation of the method, as a statistical design procedure, was tested against records for 37 catchments in central and eastern New South Wales, and is a satisfactory design method of flood peak estimation. Relationships are derived which provide design data for that area. A major practical weakness is the difficulty of estimating times of concentration - estimates using a number of empirical formulae were found to give poor correlations with observed minimum times of rise. (CSIRO)
W75-02179

SIMULATION OF FLOW RECORDS FOR AN AUSTRALIAN CATCHMENT USING THE STANFORD WATERSHED MODEL IV,
University of Strathclyde, Glasgow (Scotland). Dept. of Civil Engineering.
G. Fleming, and R. E. Black.
Civil Engineering Transactions, The Institution of Engineers Australia, Vol CE16, No 2, p 103-107, 1974. 4 fig, 5 tab, 14 ref.

Descriptors: *Model studies, *Rainfall-runoff relationships, *Small watersheds, *Australia, Watersheds(Basins), Synthesis, Instrumentation, Rain gages, Testing, Ephemeral streams, Hydrologic data, Demonstration watersheds.
Identifiers: *New South Wales(Aust).

Input data from a single year of record of the South Creek experimental catchment in New South Wales (Australia) were used to calibrate the Stanford model for application to the catchment. The characteristics of the catchment and the data available are summarised; in particular, hourly rainfall data were available only from a single Kelvin pluviograph, making it necessary to synthesise hourly rainfall over the catchment. The set of parameters obtained yielded good simulation for five other years, one of which included an extreme flood. The study demonstrates that mean daily flows for a typical Australian ephemeral stream can be synthesised by the use of the model when daily data are provided on a catchment-wide basis, even with limited hourly rainfall data and a short period of record for model calibration. (CSIRO)
W75-02180

2B. Precipitation

DISTRIBUTION OF PRECIPITATION IN MOUNTAINOUS AREAS, VOLUME 1.
Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, 1973. 228 p, 3 append.

Descriptors: *Precipitation(Atmospheric), *Conferences, *Orography, *Meteorology, *Rainfall dispositon, Mountains, Instruments, Measurement, Precipitation gages, Rainfall, Snow, Evaporation, Topography, Winds, Distribution patterns, Precipitation intensity, Hydrologic aspects, Networks, Hydrologic data, Areal, Remote sensing, Statistical methods, Time series analysis.
Identifiers: *Physiographic factors.

Distribution of precipitation in mountainous areas was discussed at a symposium held at Geilo, Norway in 1972. The five broad subject areas discussed were: (1) instruments and measuring techniques, (2) orographic influences on distribution of precipitation--meteorological factors and approaches, (3) orographic influences on distribution of precipitation--physiographic factors and hydrological approaches, (4) precipitation network design in mountainous areas, and (5) methods of computation of areal precipitation. Volume I contains the preceeding, key papers presented on each broad subject item, a summary of discussions, and symposium resolutions. Also included in an appendix are seven technical papers that were not available for preprinting in Volume II. (See W75-01962 thru W75-01972) (Humphreys-ISWS)
W75-01961

DISCUSSION OF PROBLEMS IN MEASURING PRECIPITATION IN MOUNTAINOUS AREAS,
National Weather Service, Silver Spring, Md. Hydrologic Research and Development Lab.
E. L. Peck.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 5-16, 1973. 3 fig, 14 ref.

Descriptors: *Precipitation gages, *Hydrology, *Mountains, Snowpacks, Snow, Evaporation control, Radar, Raindrops, Lysimeters, Precipitation(Atmospheric), Measurement, Winds, Windbreaks.
Identifiers: Storage gages.

The problems inherent in attempting to measure precipitation with a gage which is obstructive to wind movement were described and the suggested solutions were evaluated. These are: (1) evaporation losses in seasonal storage gages, (2) wind effects on precipitation gage catch, (3) horizontal versus sloping orifices, (4) measurement by radar, and (5) analysis of snow cover. Continued research leading to the development of an objective exposure index was recommended to evaluate the catch of a gage as a measure of the true precipitation. (See also W75-01961) (Jones-ISWS)
W75-01962

OROGRAPHIC PRECIPITATION IN MOUNTAINOUS REGIONS,
Norwegian Meteorological Inst., Oslo.
J. Nordo.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 31-56, 1973. 19 fig, 3 tab, 7 ref.

Descriptors: *Precipitation(Atmospheric), *Mountains, *Statistical methods, *Winds, *Orography, Air circulation, Atmospheric pressure, Europe, Pressure, Meteorology, Hydrologic aspects.
Identifiers: *Scandinavia, Norway, Ireland.

A quantitative relation between precipitation and the large-scale wind component normal to large mountains was presented. A statistical approach was followed over a wide range of time periods and comments and comparisons with other papers presented were included. (See also W75-01961) (Jones-ISWS)
W75-01963

OROGRAPHIC INFLUENCES ON DISTRIBUTION OF PRECIPITATION; PHYSIOGRAPHICAL FACTORS AND HYDROLOGICAL APPROACHES,
International Hydrological Decade, Bratislava (Czechoslovakia). Czechoslovak National Committee.
J. Pacl.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 67-72, 1973.

Descriptors: *Hydrology, *Mountains, *Precipitation(Atmospheric), *Runoff, Precipitation gages, *Orography, Distribution patterns, Meteorology, Watersheds(Basins).
Identifiers: Czechoslovakia, Tatra Mountains, Physiographic factors.

A short review summarized the results and conclusions of a series of papers given at the Geilo Symposium. It was found that care must be taken in presuming analogy from one area to another, particularly in small watersheds. There is sufficient data to show good correlation between precipitation and elevation for some watersheds, but the methods must take into account the season of the precipitation measurement and the geography of the area. The present increase in knowledge about the interrelationships between precipitation and hydrological, meteorological, physiographical, and orographical factors offers the greatest possibility of application to hydrological forecasting. (See also W75-01961) (Jones-ISWS)
W75-01964

PRECIPITATION NETWORK DESIGN FOR LARGE MOUNTAINOUS AREAS,
Atmospheric Environment Service, Ottawa (Ontario).
H. L. Ferguson.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 85-105, 1973. 6 fig, 2 tab, 32 ref.

Descriptors: *Network design, *Precipitation(Atmospheric), Mountains, Cost-benefit analysis, Remote sensing, Hydrology, Snowpacks, Water balance, Streamflow, Areal, Meteorology, Density, Distribution, Networks.
Identifiers: Physiographic models.

The problem of precipitation network design for mountainous areas larger than about 10,000 sq km was examined. It was assumed that a principal objective of the network is to optimize the areal precipitation distributions under the constraint of economic factors on the general network density and time-resolution. Network design is related to the problem of developing practical analytical models. The application of results from small intensively-instrumented research basins was discussed, along with the implications of rapidly expanding remote sensing technology. Principal recommendations concerned integration of meteorological and hydrological network planning and analyses, increased emphasis on the use of physiographic models, consistent application of benefit-cost analyses, and the development of a classification system for representative basins to facilitate transposition of research results. (See also W75-01961) (Jones-ISWS)
W75-01965

ESTIMATION OF AREAL PRECIPITATION,
Main Geophysical Observatory, Leningrad (USSR).
N. P. Rusin.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 115-128, 1973. 5 fig, 1 tab, 32 ref.

Descriptors: *Statistical methods, *Rainfall disposition, Mountains, Meteorology, Hydrology, Radar, Precipitation(Atmospheric), Areal, Measurement, Spatial distribution, Correlation analysis, Variability.
Identifiers: Physiographic factors.

At present several methods exist for the determination of the mean areal precipitation sum that are based both on averaging from point data and directly from radar. Accuracy of the areal mean depends on peculiarities of the precipitation pattern, physico-geographical conditions, the area size, the number and location of the measurement points, and also on the measurement methods and the period of averaging. An evaluation of the accuracy of the areal mean value can be accomplished with the data on the statistical structure of the precipitation. It is desirable to continue collecting data on the statistical structure of the precipitation field, that might be used for solution of the above and other tasks. It is probably reasonable to obtain such data not for every particular region, but according to the types and duration of precipitation in typical physico-geographical regions so that they can be extrapolated elsewhere. This, however, demands an additional test. (See also W75-01961) (Jones-ISWS)
W75-01966

COMPUTING ACTUAL PRECIPITATION,
Agricultural Research Service, Boise, Idaho. Northwest Watershed Research Center.
W. R. Hamon.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 159-174, 1973. 7 fig, 2 tab, 12 ref.

Descriptors: *Precipitation(Atmospheric), *Winds, *Regression analysis, Temperature, Gages, Wind velocity, Model studies, Analytical techniques, Hydrologic aspects, Meteorology, Calibrations.
Identifiers: Wind profiles.

An analytical model for computing actual precipitation from unshielded and shielded gauge data, independent of wind speed and type of precipitation, was derived by use of exponential wind functions to relate the ratios of catch by unshielded and shielded gauges to actual precipitation. The single calibration coefficient in the model was experimentally verified in the field. The ratios of unshielded and shielded gauge catch to actual precipitation were evaluated, by use of computed actual precipitation obtained by applying the model, as a function of wind speed and temperature. (See also W75-01961) (Jones-ISWS)
W75-01967

SNOW DISTRIBUTION IN AN ALPINE WATERSHED OF THE ROCKY MOUNTAINS, CANADA,
Department of the Environment, Ottawa(Ontario). Inland Waters Directorate.
H. S. Loijens.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 175-183, 1973. 3 fig, 3 tab, 7 ref.

Descriptors: *Snowpack, *Snow surveys, *Watersheds(Basins), *Precipitation(Atmospheric), Snowmelt, Snow, Mountains, Measurement, Regression analysis, Canada, Rocky Mountain Region, On-site investigations.
Identifiers: *Mistaya Basin, Physiographic factors.

A stepwise linear regression analysis of 3 years (1970-1972) of measurements of spring snow-water equivalent in the Mistaya Basin covering a range of elevation from 1500-2800 m indicated that between 81-87% of the variance in the snow-water equivalent was associated with the phisiographic variables, elevation and slope. Azimuth and forest stand density were found to be insignificant at the 95% probability level. The snow accumulation pattern over the 3 years studied was consistent, although the regression coefficients varied from year to year with increasing total winter accumulation. The results indicate that one snow course is adequate to define the annual accumulation pattern. The derived regression equations were used in combination with a square-grid system to provide areal distribution of snow-water equivalent in the basin. (See also W75-01961) (Jones-ISWS)
W75-01968

THE RELATION OF RAINFALL NETWORK DENSITY TO ACCURACY OF RUNOFF PREDICTION IN A MOUNTAINOUS BASIN,
Colorado State Univ., Fort Collins.
S. Jacobi, and D. R. Dawdy.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 214-218, 1973. 1 fig, 1 tab, 1 ref.

Descriptors: *Rainfall disposition, *Networks, Mountains, Watersheds(Basins), Rainfall, Runoff, *Runoff forecasting, Hydrographs, Floods, Model studies, Hydrology, Hydrologic data, California, Rain gages.
Identifiers: Santa Anita Creek basin.

Three recording rainfall gages in a 9.7-square-mile basin in southern California were used with a deterministic rainfall-runoff model to simulate flood hydrographs and peaks. The gain in accuracy of simulation achieved by using increasing amounts of data was discussed in terms of data network requirements. A segmented basin model extracts no more information from the rainfall data used than does a Thiessen weighted input to a nonsegmented model. (See also W75-01961) (Humphreys-ISWS)
W75-01969

SOME RAINFALL FEATURES IN MOUNTAINOUS AREAS OF COLOMBIA AND THEIR IMPACT ON NETWORK DESIGN,
World Meteorological Organization, Bogota (Colombia). Servicio Colombiano de Meteorologia e Hidrologia.
H. Lessmann, and S. Stanescu.
In: Distribution of Precipitation In Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 219-228, 1973. 7 fig, 18 ref.

Descriptors: *Rainfall disposition, *Distribution patterns, *Networks, Rainfall, Mountains, Climatic data, Stations, Planning, Tropical regions, Hydrologic data, Measurement, Density, Topography, Foreign countries, Rain gages, Meteorology, Precipitation(Atmospheric).
Identifiers: *Colombia.

Recent investigations conducted on tropical climates in America indicate that in the mountain areas of Colombia, the variation of rainfall in time and space is very complex. The determination of rainfall regime and special features of precipitation in areas where direct measurements were missing depended directly on the density and distribution of rainfall stations. To determine values of mean precipitation in tropical mountain regions of Colombia, the pluviometric network should have an approximate density of one station for 200 sq km. The elevation difference between two nearby stations should not be more than 200 m. Therefore, in the mountainous regions at least 4000 rainfall stations would be needed. To determine the different parameters of individual storms in these regions of Colombia, the rainfall network should have a density of one station every 25 sq km. For this situation, a network for the determination of maximum rainfall, intensity, etc., would require more than 20,000 rainfall stations to satisfactorily cover all the mountain areas of Colombia. Economic limitations restrict application of these criteria of network density in Colombia. Application of the criteria is feasible only in densely populated areas and those areas with large economical development. The opinion was expressed that the future resolution of this serious problem can be found only in the use of meteorological radar. (See also W75-01961) (Humphreys-ISWS)
W75-01970

THE VARIATION OF MEAN ANNUAL RAINFALL WITH ALTITUDE AND LOCALITY IN SOUTH AFRICA, AS DETERMINED BY MULTIPLE CURVILINEAR REGRESSION ANALYSIS,
Department of Water Affairs, Pretoria (South Africa). Div. of Hydrology.
J. S. Whitmore.
In: Distribution of Precipitation in Mountainous Areas, Volume I; Proceedings of the Geilo Symposium, Geilo, Norway, July 31-August 5, 1972. World Meteorological Organization Publication No 326 (2 Vol), Geneva, Switzerland, p 188-200, 1973. 5 fig, 2 tab, 1 ref.

Descriptors: *Precipitation(Atmospheric), *Altitude, *Mountains, Topography, *Regression analysis, Rainfall, Climates, Meteorology.
Identifiers: *South Africa, *Multiple curvilinear analysis, Continentality, Aspect, Trend.

A semi-graphical method of multiple curvilinear regression analysis was used to derive the relationship between mean annual rainfall and altitude, and modifications caused by factors such as aspect, continentality, and topographic trend. The relationships yielded by such an analysis can be used to estimate mean annual rainfall from locality and site factors alone in a region where there are no rain-gauges. (See also W75-01961) (Jones-ISWS)
W75-01971

THE DISTRIBUTION OF ATMOSPHERIC PRECIPITATION IN ALBANIA, (LA REPARTITION DES PRECIPITATIONS ATMOSPHERIQUES EN ALBANIA),
Instituti Hidrometeorologijik, Tirana (Albania).
R. Mukeli.
In: Distribution of Precipitation in Mountainous Areas, Volume I, Proceedings of Geilo Symposium, Geilo, Norway, July 31--August 5, 1972. World Meteorological Publication, No 326 (2 vol) Geneva, Switzerland, p 202-213.

Descriptors: *Precipitation(Atmospheric), *Seasonal, Annual, Precipitation intensity, Rainfall intensity, *Distribution patterns, *Rainfall disposition, *Correlation analysis, Climatic data.
Identifiers: *Albania, Mediterranean climates, *Annual precipitation.

Albania is mainly a mountainous country and it is located in the mediterranean zone. The distribution of the annual precipitations and those within the year bear the characteristics of the mediterranean climate. The quantity and the distribution of the precipitations are conditioned by the geographical location and by the orography of the country. Based on the existing data reduced for a period of 35 years and applying the theory of correlation for a number of variables an equation has been formulated for the accounting of the precipitations for every locality of the territory in relation to the geographic parameters of height and distance of given places from the sea. In this way not only can the average annual precipitations be accounted but also those of the cold semestral part of the year. The actual precipitation data are compared with those obtained by calculations. The precipitation of the hot semestral part of the year, and particularly those seasonal, deviate to a large scale from this dependence. (See also W75-01961)
W75-01972

A SUMMARY OF THE U.S. NAVY PROGRAM AND FY 1967 PROGRESS IN WEATHER MODIFICATION AND CONTROL.
Navy Weather Research Facility, Norfolk, Va.
For primary bibliographic entry see Field 3B.
W75-01975

THE PROBABILITY OF CONSECUTIVE RAINLESS DAYS,
Forest Service (USDA), Ogden, Utah. Intermountain Forest and Range Experiment Station.
E. E. Farmer, and J. W. Homeyer.
Water Resources Bulletin, Vol 10, No 5, p 914-924, October 1974. 5 fig, 1 tab, 9 ref.

Descriptors: *Probability, *Markov process, Persistence, Fourier analysis, *Regression analysis, *Computer models, Rainfall disposition, *Utah, Droughts, Precipitation(Atmospheric).
Identifiers: *Dry days, Geometric distributions, Gamma function.

A method was described for estimating the probability of occurrence of a dry-day period, starting on any specified day, as short as 3 consecutive days or as long as 30 consecutive days. The area concerned was the Intermountain region east of Great Salt Lake and the western foot of the Wasatch Range. Rainfall records from a Farmington, Utah, weather station were used to generate a computationally simple method of producing the desired estimates. Starting with a simple first order Markov chain model, estimated probabilities were introduced resulting from smoothing by a Fourier Series that reduced variance compared to original probabilities. The Markov model produced probability estimates of consecutive dry days that were too conservative, especially for long dry-day periods which are characteristic of the Intermountain region. The best estimate of the probability of consecutive dry days were those obtained directly from a representative rainfall record and smoothed by the partial sums of a Fourier series. (Roberts-ISWS)
W75-01976

A SUMMARY OF THE U.S. NAVY PROGRAM AND FY 1968 PROGRESS IN WEATHER MODIFICATION AND CONTROL.
Navy Weather Research Facility, Norfolk, Va.
For primary bibliographic entry see Field 3B.
W75-01979

THE DEVELOPMENT OF CLIMATOLOGICAL INSTRUMENTATION SYSTEMS FOR USE IN A NUMBER OF REMOTE LOCATIONS,
Bureau of Meteorology, Melbourne (Australia).
E. E. Jesson.
Australian Journal of Instrumentation and Control, Vol 30, No 4, p 10-14, August 1974. 3 tab, 1 ref.

Descriptors: *Instrumentation, *Automation, *Evaluation, *On-site tests, *Australia, *Meteorological data, Electronic equipment, Maintenance, Measurement, Rain gages, On-site data collections, Gaging stations, Data processing, Computers, Charts, Remote control, Testing.

The extent of the requirement for acquiring meteorological data in remote uninhabited regions in Australia demands the use of completely self-contained recording systems capable of operating for up to six months without attention and producing output data suited to automatic processing. A detailed review is provided of test conducted by the Australian Bureau of Meteorology, with particular reference to rainfall recorders of the Analogue Chart and Digital Event Recorder types. Four systems of climatological recording station (providing data on winds, solar radiation, temperature and humidity as well as rainfall) are also being evaluated. The tests have led to the concept of using small, simple recorders operated by inspectors with user training rather than technicians. The number of recorders involved requires the use of an off-line data transcription system to interface the field data to the Bureau's high-speed computer. (CSIRO)
W75-02172

2C. Snow, Ice, and Frost

SNOW DISTRIBUTION IN AN ALPINE WATERSHED OF THE ROCKY MOUNTAINS, CANADA,
Department of the Environment, Ottawa(Ontario). Inland Waters Directorate.
For primary bibliographic entry see Field 2B.
W75-01968

A COUPLED HEAT AND MOISTURE TRANSPORT MODEL FOR ARCTIC SOILS,
Alaska Univ., College. Inst. of Water Resources.
G. L. Guymon, and J. N. Luthin.
Water Resources Research, Vol 10, No 5, p 995-1001, October 1974. 1 fig, 27 ref. OWRR C-4049.

Descriptors: *Arctic, *Permafrost, *Soil moisture, *Soil water movement, *Thermal properties, *Frozen soils, Alaska, Thawing, Freezing, Tundra, Hydraulic conductivity, Frost heaving, Darcys law, Conduction, Computer models, Equations, Numerical analysis.
Identifiers: *Fairbanks, Richards equation.

The thermal and moisture regimes of arctic and subarctic soils act in parallel in a complex manner and must be considered together. The problem of moisture movement and storage in these soils is complicated by water undergoing a phase change during freezing and thawing and by the presence of ice-rich permafrost. A one-dimensional model of these processes was developed based on an equivalent quasi-linear variational functional for the Richards equation and the heat conduction equation including convective components. The variational functional was solved by a finite element analog. Convergence and stability were investigated, and it was concluded that the numerical procedure is convergent and stable in general. (Sanderson-ISWS)
W75-01992

SEA ICE BOTTOMSIDE FEATURES IN THE DENMARK STRAIT,
Naval Oceanographic Office, Washington, D.C. Polar Oceanography Div.
T. L. Kozo, and W. B. Tucker.
Journal of Geophysical Research, Vol 79, No 30, p 4505-4511, October 20, 1974. 10 fig, 1 tab, 14 ref.

Descriptors: *Sea ice, *Ice cover, On-site investigations, Ice, Ice-water interfaces, Profiles, Shape, Surfaces, Topography, Canopy, Evaluation, Sonar, Analytical techniques, Surveys, Statistical methods, Data processing, Data collections, Instrumentation.
Identifiers: *Denmark Strait, Bottomside features.

A first step toward describing the features of deformed ice in the marginal sea ice zone was presented. Analogue ice draft data were obtained in March 1971 by a narrow-beam high-frequency upward-looking sonar mounted on a submarine transiting beneath the ice in the Denmark Strait. The majority of data was digitized, and cubic spline techniques were applied to obtain even grid intervals for ease of analysis. Utilization of statistical classifiers including standard deviation, coefficients of correlation between adjacent depths, variance spectra, Fourier analysis, and comparison of red and white noise ratios showed a systematic change in the overhead ice structures as the submarine moved from the ice edge inward toward the Greenland coast. The results, coupled with analysis of the remaining analogue data, suggest identifiable characteristics for five regimes progressing inward from the outer ice edge. Regime 1 was predominantly composed of flows less than 50 m wide, without ridges. Regime 2 had shallow draft ridges and increased flow diameters. Regime 3 was a transitional zone averaging one ridge per kilometer (deeper than 6 m) with some floe diameters up to 100 m. Regime 4 was the last regime within the dynamic marginal ice zone. It exists in a probable shear region with deep-drafted recently formed ridges, with more than twice the ridge frequency of regime 3, and with floe diameters up to 150 m. Regime 5 is the outer edge of a zone of consolidated multiyear ice with large (almost 400-m-diameter) thick floes and maximum ridge drafts approaching 20 m. (Humphreys-ISWS)
W75-01993

THEORY OF THE OPTICAL PROPERTIES OF SNOW,
Arizona Univ., Tucson. Dept. of Watershed Management.
C. F. Bhoren, and B. R. Barkstrom.
Journal of Geophysical Research, Vol 79, No 30, p 4527-4535, October 20, 1974. 4 fig, 1 tab, 31 ref.

Descriptors: *Snow, *Optical properties, *Theoretical analysis, Refractivity, Density, Mathematical studies, Snowpack, Albedo, Light penetration, Light, Opacity.

The optical properties of a snowpack were calculated, giving relations between the asymptotic flux extinction coefficient and albedo under diffuse illumination on the one hand and the density, grain size, and wavelength, on the other. A geometrical optics calculation of the properties of a single grain was used with approximate solutions of the radiative transfer problem. Most of the scattering was the result of change in direction of the light beam upon transmission through the grain, rather than reflection. The asymptotic flux extinction coefficient was directly proportional to the snowpack density and inversely proportional to the square root of the grain size. The albedo under diffuse illumination was independent of density and proportional to the square root of the grain size. The derived relations agreed with experimental data to within 20% for the flux extinction coefficient and to better than 2% for the albedo without using adjustable parameters. Higher values of the flux extinction coefficent will be measured if the snow is confined within a finite cylinder with absorbing sides. An analysis of this effect was given. (Humphreys-ISWS)
W75-01995

COMPARISON OF RECENT SEAWATER FREEZING POINT DATA,
Rhode Island Univ., Kingston. Graduate School of Oceanography.
D. R. Kester.
Journal of Geophysical Research, Vol 79, No 30, p 4555-4556, October 20, 1974. 1 fig, 6 ref. NSF Grant GA-19940.

Descriptors: *Sea water, *Freezing, *Temperature, *Salinity, *Physical properties, Oceans, Saline water, Statistical methods, Oceanography, Water properties, Chemical properties, Surface waters, Water quality, Pressure, Water pressure, Ice, Ice-brine systems, Hydrostatic pressure, Supercooling, Thermodynamics.

Two recent investigations of the freezing point of seawater agree to within 0.005 C over the range of 10-40 parts per thousand salinity. Even though these results represent a substantial improvement over the previous data, there is a systematic difference that exceeds the precision of each set. The effect of pressure on the freezing point of seawater measured experimentally was 1.3% greater than the value calculated from thermodynamic relationships. These new data will permit an improved quantitative assessment of the significance of seawater cooling by contact with ice under hydrostatic pressure. (Henley-ISWS)
W75-01999

2D. Evaporation and Transpiration

DROUGHT EFFECTS ON THE GROWTH AND YIELD OF GRAIN SORGHUM, (IN FRENCH),
Institut National de la Recherche Agronomique, Toulouse (France). Station d'Agronomie.
For primary bibliographic entry see Field 3F.
W75-01681

EFFECT OF EVAPORATION DEPRESSORS ON SOIL MICROFLORA, (IN UKRANIAN).
Kiev State Univ. (USSR).
Mikrobiol Zh (Kiev), Vol 35, No 6, p 696-698, 1973. English summary.
Identifiers: Actinomycetes, Butyric acid, *Evaporation depressors, Flora, Fungi, Microorganisms, Nitrogen, Paraffin, *Soil microflora, Soil moisture.

Application of technical paraffin-chemical industry waste-to soil in a quantity of 0.3% of surface layer weight favored soil moisture preservation and creation of better conditions for development of soil microflora (actinomycetes, fungi, N-fixing microorganisms, butyric acid microorganisms).--Copyright 1974, Biological Abstracts, Inc.
W75-01724

EVAPOTRANSPIRATION OF SOME SIMPLE CORN HYBRIDS IN OPTIMUM MOISTURE CONDITIONS OR IN SOIL DROUGHT CONDITIONS, (IN ROMANIAN),
Institutul de Cercetari Pentru Cereale si Plante Tehnice, Fundulea (Rumania).
T. Muresan, and C. I. Milica.
An Inst Cercet Cereale Plante Teh Fund Ser C Amelior Genet Fiziol Tehnol Agric. 38. p 179-190, 1972. Illus. English summary.

Descriptors: *Corn(Field), Crops, Cereal crops, Drought tolerance, Evapotranspiration, Irrigation.
Identifiers: Corn hybrids.

Research conducted under controlled water regime in greenhouse conditions aimed at determining the characteristics of daily water consumption through evapotranspiration, in 8 simple corn hybrids developed at Fundulea (Romania). Daily water consumption of plants kept under optimum water conditions (corresponding to the irrigation regime), or under sol drought conditions was interpreted mathematically with values for total

evaporation (ET) and potential evapotranspiration according to Thornthwaite obtained by integration of the meteorological data for the experimentation years (1968, 1969) and of the averages for a 70 yr period. The course of weather conditions significantly influenced total water consumption, the evapotranspiration of corn highly correlating to relative air moisture, cloudiness, and to average daily temperature ($r > 0.70$). In optimum soil moisture conditions, average daily consumption amounted to 78 cu m/ha in 1968 and to 57 cu m/ha in 1969. During this same period, corn plants under soil water stress eliminated by evapotranspiration, about 36 cu m/day/ha in 1968 and 28 cu m/day/ha in 1969. Under both moisture conditions, early hybrids eliminated a smaller water amount as compared to the semi-early hybrids and semi-late hybrids. Average water consumption, as related to leaf area/g/sq m of leaves is noneconomical in hybrids with a weaker drought resistance potential. By contrast, water consumption is economical in other hybrids due to a metabolic control of water flow and to the opening degree of the stomata.--Copyright 1974, Biological Abstracts, Inc.
W75-01775

ESTIMATION OF DAILY SOIL MOISTURE FOR WINTER WHEAT IN KANSAS,
Kansas State Univ., Manhattan. Dept. of Agronomy.
R. L. Vanderlip, and M. J. Brown.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 839, $3.75 in paper copy, $2.25 in microfiche. Kansas Water Resources Research Institute, Manhattan, Contribution No 139, August 1974. 40 p, 8 fig, 16 tab, 26 ref, append. OWRT A-053-KAN(1). 14-31-0001-3816.

Descriptors: *Soil moisture, Growth stages, Evapotranspiration, *Kansas, *Wheat, *Estimating, *Crop production.
Identifiers: *Winter wheat.

Soil moisture is an important limiting factor in winter wheat production both in Kansas and the Great Plains area. Better soil moisture data is needed to relate wheat production both to moisture availability and to fertilizer response. A soil moisture estimation procedure which uses climatic, soil, and plant parameters which was developed for the spring wheat area in Canada was tested for winter wheat in Kansas. Utilizing irrigation studies from Garden City, Kansas, crop coefficients for the spring growth period of winter wheat were determined. Agreement between estimated and actual moisture values was quite good, $R2 = 0.86$. Two types of field conditions caused consistent errors in the estimation procedure. First, when soil moisture approached the permanent wilting point the estimation procedure underestimated the amount of moisture used, and, therefore, overestimated the amount of soil moisture available. Second, following large applications of water either as irrigation or rainfall, estimated moisture use was greater than actual use from the upper soil layers and total use was underestimated.
W75-01855

THE HEAT BALANCE OF ALFALFA AS RELATED TO ITS IRRIGATION WATER REQUIREMENT,
Institute for Atmospheric Physics, Budapest (Hungary).
For primary bibliographic entry see Field 3F.
W75-01907

ESTIMATING EVAPOTRANSPIRATION USING CANOPY TEMPERATURES: FIELD EVALUATION,
Kansas Agricultural Experiment Station, Manhattan. Evapotranspiration Lab.
L. R. Stone, and M. L. Horton.
Agron J. Vol 66, No 3, p 450-454, 1974, Illus.

Identifiers: Canopy temperature(Crops), *Evapotranspiration, *Linear regression analysis, *Sorghum-bicolor, Transpiration.

Thermal scanners provide a possible way of estimating water loss from surfaces by using remotely sensed surface temperatures. In this study, designed to evaluate the feasibility of using canopy temperatures in estimating evapotranspiration (ET), 5 equations were used. Sorghum bicolor L. (Moench) was used in the field investigation. Three of the equations were the well-known methods of van Bavel, Penman and energy budget-Bowen ratio. The other 2 use the temperature of the evaporating surface in estimating ET and are referred to as the Bartholic-Namken-Wiegand (B-N-W) and Brown-Rosenberg (B-R) methods. Using simple linear regression and correlation analyses, the B-N-W estimates were found to be approximately 17% smaller and the B-R estimates to be approximately 22% larger than typical estimates obtained by the Penman and energy budget-Bowen ratio methods. Both methods appear usable in determining ET rates of vegetated surfaces, with the B-N-W method requiring less input data than the B-R method.--Copyright 1974, Biological Abstracts, Inc.
W75-01940

2E. Streamflow and Runoff

DRAINAGE SYSTEM.
Minn Stat Ann, sec 106.651 (Supp 1973).

Descriptors: *Drainage systems, *Ditches, *Water control, *Minnesota, *Legislation, Drainage programs, Regulation, Drainage water, Drainage, Surface runoff, Surface waters, Drainage area, Controlled drainage, Drainage practices, Surface drainage, Legal aspects, Water law, Diversion, Diversion structures, Water management(Applied).

This Minnesota statute provides owners of land which has been assessed for the benefits of a drainage system a means of having their lands removed from the system, if through diversion of water, the lands no longer utilize the system. The lands may also be removed if, by reason of the construction of any dam authorized by law, the properties in question can no longer utilize the drainage system or receive benefits from it. The lands and properties so removed shall be deemed no longer affected by the ditch as to any subsequent proceedings for repairs or improvements to the system. No lien or assessment shall thereafter be made against such lands and properties for repairs or improvements made subsequent to the date of the order removing the land from the system. A petitioner wishing to have his land set off from the system must show that waters from his land have been diverted from the system, the system is no longer being utilized or benefited from and that removal of the land will not prejudice owners of land remaining in the system. (Ritchie-Florida)
W75-01796

FLOOD PROFILES AND INUNDATED AREAS ALONG THE SKOKOMISH RIVER, WASHINGTON.
Geological Survey, Tacoma, Wash.
Available from NTIS, Springfield, Va. 22161 as PB-231 765, $3.25 in Paper copy, $2.25 Microfiche. Geological Survey Water-Resources Investigations 62-73, 1974. 20 p, 5 fig, 3 tab, 2 ref.

Descriptors: *Flood profiles, *Washington, *Flood frequency, Floods, Flood recurrence interval, Discharge(Water), Peak discharge.
Identifiers: *Skokomish River(Wash).

Flood profiles were calculated for Skokomish River and Vance Creek, Washington. The mainstem channel of the Skokomish River will contain flows only as large as 4,650 cubic feet per second downstream from U.S. Highway 101, and the flood plain in this reach is subject to inundation on an average of about 10 days each year. The mainstem channel between U.S. Highway 101 and the junction of the North and South Forks will contain flows as large as 8,900 cfs; such flows occur nearly every year and have recurred at least six times during one flood season. Flooding is minimal on the three main tributaries above their confluence at river mile 9.0. Storage and diversion at Cushman Dam No. 2 significantly reduces the magnitude of floods of the North Fork Skokomish River. On the main stem, 50- and 100-year floods are estimated to be 29,200 and 32,100 cfs, respectively. A 100-year flood is estimated to inundate most of the 1- to 2-mile-wide valley downstream from river mile 9.0. (Knapp-USGS)
W75-01815

PROJECT EVALUATION OF 'INVESTIGATION AND ANALYSIS OF FLOODS FROM SMALL DRAINAGE AREAS IN NEW MEXICO' --A PROGRESS REPORT,
Geological Survey, Albuquerque, N. Mex.
A. G. Scott.
Open-file report, July 1974. 57 p, 20 fig, 4 tab, 6 ref.

Descriptors: *Flood forecasting, *Design flood, *New Mexico, Bridges, Culverts, Small watersheds, Hydrograph analysis, Rainfall-runoff relationships.

To predict floods from small watersheds in New Mexico, the record of annual peaks for one station was extended by utilizing a rainfall-runoff hydrograph simulation model. A comparison of frequency curves of annual peaks for recorded and simulated data indicates that results of the simulation are reasonable. This is part of a study which is to obtain and analyze hydrologic data which can be used in the design of highway structures. Data and an analysis should allow estimation of flood peaks having recurrence intervals of as much as 50 years at any virtually natural flow site and with an accuracy equivalent to the accuracy of the estimate from 10 years of observed flood record of the site. This report describes the progress of the study through June 1972 and presents an evaluation of the adequacy of the data being collected and an evaluation of the proposed methods of analysis to see if the program objectives can be met. (Knapp-USGS)
W75-01823

DETERMINATION OF CHANNEL CAPACITY OF THE SAN JOAQUIN RIVER DOWNSTREAM FROM THE MERCED RIVER, MERCED, STANISLAUS, AND SAN JOAQUIN COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
W75-01824

HYDROLOGIC DATA FOR URBAN STUDIES IN THE DALLAS, TEXAS METROPOLITAN AREA, 1972,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 7C.
W75-01825

HYDRAULIC ANALYSIS OF FLOODFLOWS IN BUTTE BASIN AT STATE HIGHWAY 162, GLENN AND BUTTE COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 8B.
W75-01843

VELOCITY-HEAD ROD AND CURRENT METER USE IN BOULDER-STREWN MOUNTAIN STREAMS,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 4A.
W75-01862

MISSISSIPPI RIVER FLOOD MAPS FROM ERTS-1 DIGITAL DATA,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
A. N. Williamson.
Water Resources Bulletin, Vol 10, No 5, p 1050-1059, October 1974. 9 fig.

Descriptors: *Remote sensing, *Flood data, *River basins, Photography, Data processing, Maps, Reflectance, Radiation, Spectrophotometry, Computers, Digital computers, *Mississippi River, Floods.
Identifiers: *ERTS-1, *Multispectral scanner.

The U.S. Army Engineer Waterways Experiment Station surveyed the Lower Mississippi River during the 1973 flood, using data provided by the NASA Earth Resources Technology Satellite (ERTS-1). The ERTS-1 multispectral scanner detected radiant energy reflected from the earth's surface. It separated the energy it received into four spectral bands which were converted to an electric analog and then changed to digital form and transmitted via telemetry to ground receiving stations where the data were recorded on computer compatible magnetic tapes. An explanation was presented of the data processing technique, and an example of a flood output product with a practical application was given, showing the advantage over the adverse effects resulting from time dependency of former photograph acquisition by aerial surveys. (Roberts-ISWS)
W75-01974

MODELING OF STOCHASTIC-DETERMINISTIC HYDROLOGIC SYSTEMS,
Monash Univ., Clayton (Australia). Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-01977

MAPPING OF THE 1973 MISSISSIPPI RIVER FLOODS BY THE NOAA-2 SATELLITE,
National Environmental Satellite Service, Washington, D.C.
D. R. Wiesnet, D. F. McGinnis, and J. A. Pritchard.
Water Resources Bulletin, Vol 10, No 5, p 1040-1049, October 1974. 8 fig, 1 tab, 6 ref.

Descriptors: *Satellites(Artificial), *Remote sensing, *Floods, Flooding, Photography, Floodwater, Aerial, Missouri, Decision making, Flood data, Rivers, Mapping, *Mississippi River, Missouri River.
Identifiers: *St Louis, Illinois River.

Satellite imagery was shown to have considerable input to the analysis of flooding problems. Numerous color photographs of flooding on the Illinois, Mississippi, and Missouri Rivers near St. Louis, Missouri, were used to illustrate the capabilities of present remote sensing systems. Limitations to more technical needs were noted. These limitations preclude using the system for flash flood warnings, for flood mapping on small streams (i.e., those with valley widths less than 3 km), and for precise delineation of flood areas. The system can rapidly furnish information on developing floods, for decision making with regard to disaster relief, and for a record of flood buildup and subsequent abatement. (Jess-ISWS)
W75-01981

FLOOD HAZARD STUDIES IN THE MISSISSIPPI RIVER BASIN USING REMOTE SENSING,
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A. Rango, and A. T. Anderson.
Water Resources Bulletin, Vol 10, No 5, p 1060-1081, October 1974. 9 fig, 1 tab, 12 ref.

Descriptors: *Flooding, *Watershed management, *Remote sensing, Flood data, Flood plains, Floodways, Mapping, Satellites(Artificial), Infrared radiation, Backwater, Flood plain insurance, Flood plain zoning, *Mississippi River Basin, Hazards, Flood damage.
Identifiers: ERTS-1, Imagery.

The spring 1973 Mississippi River flood was investigated using remotely sensed data from ERTS-1. Both manual and automatic analyses of the data indicated that ERTS-1 is extremely useful as a regional tool for flood management. Quantitative estimates of area flooded were made in St. Charles County, Missouri, and Arkansas. Flood hazard mapping was conducted in three study areas along the Mississippi River using pre-flood ERTS-1 imagery enlarged to 1 to 250,000 and 1 to 100,000 scales. The flood prone areas delineated on these maps correspond to areas that would be inundated by significant flooding (approximately the 100 year flood). The flood prone area boundaries were generally in agreement with flood hazard maps produced by the U.S. Army Crops of Engineers and U.S. Geological Survey. Initial results indicated that ERTS-1 digital mapping of flood prone areas can be performed at 1 to 62,500 which is comparable to some conventional flood hazard map scales. (Terstriep-ISWS)
W75-01983

LIMITATIONS IN THE USE OF DOUBLE-MASS CURVES,
Ministry of Works, Wellington (New Zealand). Water and Soil Div.
M. Wigbout.
Journal of Hydrology (New Zealand), Vol 12, No 2, p 132-138, 1973. 3 fig, 1 tab, 4 ref.

Descriptors: *Mass curves, *Hydrologic data, *Runoff, *Regression analysis, Data processing, Streamflow, Synthetic hydrology, Model studies, Variability, Mathematics, Equations, Data collections, Analytical techniques.

The double-mass curve is a well-known tool for checking and adjusting inconsistencies in hydrological data caused by changes in the methods of observation or data processing. Usually the relationship between two records is a fixed ratio and the double-mass curve is a straight line. A break in this curve warns the investigator to check for the inconsistencies. However, some difficulties are caused by difficult detection of an outlier, determination of a breakpoint, and structure of the data. It was suggested that the differences between the observed variable and the corresponding variable (at the station used for testing) multiplied by the regression coefficient be plotted against the years. A sudden change in this series of differences indicates that there is some inconsistency in the data. The proposed method makes detection of outliers easier and yields a better idea of the underlying structure of the data. (Singh-ISWS)
W75-01989

MAGNITUDE AND FREQUENCY OF FLOODS IN NEW JERSEY WITH EFFECTS OF URBANIZATION,
Geological Survey, Trenton, N.J.
For primary bibliographic entry see Field 4C.
W75-02119

SUMMARY AND EVALUATION OF CREST-STAGE-GAGE DATA IN NEW YORK,
Geological Survey, Albany, N.Y.
B. B. Eissler, and T. J. Zembrzuski, Jr.
Open-file report, 1974. 24 p, 3 fig, 1 plate, 1 tab, 10 ref.

Descriptors: *Peak discharge, *Stream gages, *Crest-stage gages, *New York, Data collections, Hydrologic data, Water measurement, Discharge measurement.

Annual peak stages and discharges are reported for 106 crest-stage-gaging stations in New York. Considerable data for continuing flood-frequency studies are available for stations having large drainage areas. Only 17 stations represent small drainage areas (approximately 10 sq mi or less), and five of those stations are in Rockland County. Providing flood data for planning and design related to small streams will require additional crest-stage-gaging stations. (Knapp-USGS)
W75-02120

WATER-RESOURCES APPRAISAL OF RAILROAD AND PENOYER VALLEYS, EAST-CENTRAL NEVADA,
Geological Survey, Carson City, Nev.
A. S. Van Denburgh, and F. E. Rush.
Nevada Division of Water Resources, Carson City, Water Resources--Reconnaissance Series Report 60, 1974. 61 p, 2 fig, 1 plate, 4 photo, 18 tab, 48 ref.

Descriptors: *Water resources, *Surface waters, *Groundwater, *Nevada, Arid lands, Deserts, Water yield, Hydrologic data, Water utilization, Water quality.
Identifiers: *Railroad Valley(Nev), *Penoyer Valley(Nev).

Water resources were appraised for Railroad and Penoyer Valleys, east-central Nevada. The 3,452-square-mile study area lies in the Great Basin, south of Eureka. Altitudes range from 11,513 feet atop Currant Mountain to 4,706 and 4,738 feet at the lowest points in Railroad and Penoyer Valleys, respectively. Precipitation averages about 5 inches per year at lowest altitudes, and more than 20 inches in the highest areas. Railroad Valley contains three large spring groups: Big Warm Spring at Duckwater, with a flow of about 13 cfs; Blue Eagle Spring south of Currant, flowing about 4 cfs; and the several springs at Lockes, totaling about 3 cfs. Irrigation, which is restricted to Railroad Valley, consumed about 14,000 acre-feet of groundwater (mostly springflow) and about 1,500 acre-feet of water from Currant Creek. Flooding for waterfowl habitats in Railroad Valley consumed about 1,300 acre-feet. Domestic use totaled 10-15 acre-feet, all but a fraction of which was in Railroad Valley. Livestock used 20-30 acre-feet in Railroad Valley and less than 10 acre-feet in Penoyer Valley. The oilfield produced about 20 acre-feet of brine as a byproduct of the oil. Except beneath and immediately adjacent to the three playas, where salinity is excessive, most groundwater is relatively dilute. The dissolved solids are dominated by bicarbonate and either calcium or sodium. In some parts of northern Railroad Valley, the water is fresher at depth than in the uppermost waterbearing zones. Stream waters resemble the groundwaters. Almost all water in the two valleys is suitable for irrigation. (Knapp-USGS)
W75-02125

WATER RESOURCES OF THE UPPER NEUSE RIVER BASIN, NORTH CAROLINA,
Geological Survey, Raleigh, N.C.
A. L. Putnam, and K. L. Lindskov.
Available from NTIS, Springfield, Va. 22161 as PB-237 304/As, $4.75 in paper copy, $2.25 in microfiche. Water-Resources Investigations 12-73, 1973. 68 p, 30 fig, 4 tab, 34 ref.

Descriptors: *Water resources, *Surface waters, *Groundwater, *North Carolina, Streamflow, Water yield, Runoff, Water quality, Water utilization, Data collections, Hydrologic data, Hydrogeology.
Identifiers: *Neuse River Basin(NC).

Major streams of the upper Neuse River basin of North Carolina have the potential of supplying more than 10 times the quantity of water presently being withdrawn. The average annual streamflow of the basin during 1925-68 was about 320 million gallons per day while estimated withdrawals including groundwater are at the rate of 20 mgd. Draft requirements of as much as 50% of the mean annual flow of streams can be met by seasonal or within-year-storage. Larger drafts would require carryover of over-year reservoir storages, although draft rates larger than 60% to 70% of the mean annual flow may not be economically feasible. Only a fraction of the groundwater resources capability is being utilized. Present estimated usage of 3 to 4 mgd mostly on farms and in rural areas and by smaller industries could be increased to about 50 mgd with proper location and management of wells. Both surface waters and groundwaters are generally of good quality. Except for a part of the Eno River and one or two smaller tributaries of the Neuse at the lower end of the basin, surface waters are soft and have low concentrations of dissolved substances. Most groundwater supplies are slightly acidic and slightly high in iron. In some areas hardness and chlorides may be higher than desirable. For the most part, however, waters meet the drinking-water standards of the Public Health Service. (Knapp-USGS)
W75-02127

MAP SHOWING DRAINAGE AREAS, MIDDLE HADDAM QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02129

MAP SHOWING DRAINAGE AREAS, SPRING HILL QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02131

MAP SHOWING DRAINAGE AREAS, ESSEX QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02133

MAP SHOWING DRAINAGE AREAS, CLINTON QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02134

MAP SHOWING DRAINAGE AREAS, DEEP RIVER QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02135

MAP SHOWING DRAINAGE AREAS, MOODUS QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02136

THE EFFECTS OF THE HURRICANE AGNES FLOOD ON CHANNEL GEOMETRY AND SEDIMENT DISCHARGE OF SELECTED STREAMS IN THE SUSQUEHANNA RIVER BASIN, PENNSYLVANIA,
Geological Survey, Harrisburg, Pa.
For primary bibliographic entry see Field 2J.
W75-02139

2F. Groundwater

SEEPAGE THROUGH SOIL BEDDING OR A HILLSIDE DUE TO A STEADY RAINFALL,
British Columbia Univ., Vancouver. Dept. of Geological Sciences.
For primary bibliographic entry see Field 2G.
W75-01665

FIELD STUDY OF THE FLOW PROCESSES IN A POROUS AQUIFER BY MEANS OF TRACER DYES (FELDUNTERSUCHUNGEN VON FLIESSVORGAENGEN IN EINEM PORENGRUNDWASSERLEITER MITTELS FARBSTOFFINDIKATOREN),
Heidelberg Univ. (West Germany). Physikalisches Institut (II).
Y. Atakan, W. Roether, G. Matthees, and K. Muennich.
Gas-Wasser-Fach-Wasser/Abwasser, Vol 115, No 4, p 159-164, April, 1974. 8 fig, 1 tab, 10 ref.

Descriptors: *Flow rate, *Aquifers, *Groundwater movement, Analytical techniques, Dispersion, Tracers, Dyes, Dye dispersion.
Identifiers: *Rhine Valley, Tracer dyes, Rhodanine B, Uranin, *Dispersion coefficient.

The flow rate and the longitudinal dispersion of groundwater in a porous acquifer (sand) in the Upper Rhine Valley was studied by means of rhodamine B and uranin at depths of 3.5-5.5 m; 8-9 m, and 13-15 m. Both the flow rate and the flow direction were found to be practically identical within this depth range. The rate of propagation averaged 40 m per annum. Increase of the dispersion coefficient with depth in a range of 0.0005-0.0037 sq cm/sec was determined. (Takacs-FIRL)
W75-01740

EXPERIENCES WITH THE 14C AND TRITIUM METHODS IN APPLIED HYDROGEOLOGY (ERFAHRUNGEN MIT DER 14C- UND 3H-METHODE IN DER ANGEWANDTEN HYDROGEOLOGIE),
Niedersaechsisches Landesamt fuer Bodenforschung, Hanover (West Germany).
M. A. Geyh.
Oesterreichische Wasserwirtschaft, Vol 26, No 3/4, p 49-54, April 1974. 4 fig, 36 ref.

Descriptors: *Hydrogeology, *Radioactive tracers, *Aquifers, Flow characteristics, Hydraulics, *Groundwater movement.
Identifiers: *C-14 tracing, *Tritium tracing, Flowpath.

Experiences gained during the last five years with the application of the 14C and tritium tracing methods in applied hydrogeology are presented. The tracer methods proved useful, especially in the study of underground waters in confined aquifers in loose rocks. These methods were used primarily for the determination of the flow velocity and direction, for the localization of water capture areas and preferred flowpaths, as well as for the exploration of hydraulic communications among different groundwater systems. In the case of unconfined aquifers in loose rocks, tracing methods supply qualitative information on the hydrodynamic conditions. Reliable, quantitative interpretation of the results is possible. The interpretation of tracing data in solid rocks is problematic and even impossible if large storage spaces are present in the source and capture area. (Takacs-FIRL)
W75-01741

GEOLOGIC AND HYDROLOGIC CONTROL OF CHLORIDE CONTAMINATION IN AQUIFERS AT BRUNSWICK, GLYNN COUNTY, GEORGIA,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 5B.
W75-01816

SUBSURFACE GEOLOGY AND GROUNDWATER RESOURCES OF THE JACKSON PURCHASE REGION, KENTUCKY,
Geological Survey, Washington, D.C.
R. W. Davis, T. W. Lambert, and A. J. Hansen, Jr.
Available from Sup Doc, GPO, Washington, D.C. 20402. Price $9.10. Water-Supply Paper 1987, 1973. 66 p, 9 fig, 11 plate, 3 tab, 39 ref.

Descriptors: *Hydrogeology, *Groundwater, *Kentucky, Aquifers, Water yield, Transmissivity, Hydrologic data, Stratigraphy, Alluvium, Limestones, Sandstones, Artesian aquifers, Aquifer characteristics.
Identifiers: *Jackson Purchase(Ky).

The Jackson Purchase region of western Kentucky is underlain by aquifers that can yield groundwater of suitable quality and quantity for many industrial, public supply, and irrigation uses in addition to furnishing domestic supplies throughout the area. Wells capable of yielding more than 1,000 gpm can be constructed in most of the area. The availability of groundwater is controlled by the stratigraphy and structure of the aquifers that range in age from Palezoic to Quaternary. Most of the Paleozoic rocks are limestone, dolomite, and chert that were deposited in shallow seas. The Cretaceous through Holocene sands, clays, and gravels are mainly deltaic, continental, or lagoonal type sediments; only the Paleocene deposits are known to have been deposited in a marine environment. Water from most of the formations is commonly low in dissolved solids and is soft. The average temperature is about 15 deg C. Coefficients of transmissibility and storage have been determined for four formations at five places in the Jackson Purchase. Transmissibility values range from 1,300,000 gpd per ft to 22,000 gpd per ft, both values being for the Tennessee River alluvium. Coefficients of storage of all aquifers tested indicate artesian conditions. There is no regional long-term trend of either rising or falling water levels in wells tapping the aquifers in the region. Pumpage from wells is estimated to be 14.7 mgd. (Knapp-USGS)
W75-01817

CATALOG OF AQUIFER NAMES AND GEOLOGIC UNIT CODES USED BY THE WATER RESOURCES DIVISION,
Geologic Survey, Reston, Va.
W. E. Price, Jr., and C. H. Baker, Jr.
Water Resources Division report, October 1974. 306 p.

Descriptors: *Data storage and retrieval, *Aquifers, *Hydrologic data, Data processing, United States.
Identifiers: *Catalog of aquifer names.

This catalog lists the aquifer name and geologic unit codes used by the Water Resources Division of the U.S. Geological Survey for the computer processing of groundwater data. These codes are based on the stratigraphic coding system proposed by the American Association of Petroleum Geologists. The present catalog is an extensively updated version of the earlier Catalog. (Knapp-USGS)
W75-01819

BASE AND THICKNESS OF THE POST-EOCENE CONTINENTAL DEPOSITS IN THE SACRAMENTO VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2J.
W75-01844

DISTRIBUTION OF CONTAMINANTS IN POROUS MEDIA FLOW,
California Univ., Davis. Dept. of Water Science and Engineering.
For primary bibliographic entry see Field 5B.
W75-01973

DRAWDOWN IN COMPRESSIBLE UNCONFINED AQUIFER,
Birmingham Univ. (England). Dept. of Civil Engineering.
For primary bibliographic entry see Field 4B.
W75-01991

A PREDICTOR-CORRECTOR METHOD FOR SOLVING THE CONVECTION-DISPERSION EQUATION FOR ADSORPTION IN POROUS MEDIA,
Maryland Univ., College Park. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2G.
W75-01998

RECENT PALEOENVIRONMENTS AND GEOLOGICAL HISTORY AT MONTEZUMA WELL,
Northern Arizona Univ., Flagstaff.
For primary bibliographic entry see Field 4B.
W75-02048

PRELIMINARY MAP SHOWING AVAILABILITY OF GROUND WATER FROM MAJOR GLACIAL-DRIFT AQUIFERS IN GRIGGS AND STEELE COUNTIES, NORTH DAKOTA,
Geological Survey, Grand Forks, N Dak.
For primary bibliographic entry see Field 7C.
W75-02123

FLASHING FLOW IN HOT WATER GEOTHERMAL WELLS: COMPUTER PROGRAM,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 7C.
W75-02124

LAND-SURFACE SUBSIDENCE IN THE AREA OF BURNETT, SCOTT, AND CRYSTAL BAYS NEAR BAYTOWN, TEXAS,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 4B.
W75-02126

CONTOUR MAP OF THE BEDROCK SURFACE, GREENFIELD QUADRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
For primary bibliographic entry see Field 7C.
W75-02130

CONTOUR MAP OF THE BEDROCK SURFACE, MOUNT TOBY QUANDRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
For primary bibliographic entry see Field 7C.
W75-02132

FLASHING FLOW IN HOT-WATER GEOTHERMAL WELLS,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4B.
W75-02138

THE NUMERICAL SOLUTION OF THE STEADY INTERFACE IN A CONFINED COASTAL AQUIFER,
James Cook Univ. of North Queensland, Townsville (Australia).
W. P. Cantatore, and B. E. Volker.
Civil Engineering Transactions, the Institution of Engineers Australia, Vol CE16, No 2, p 115-119, 1974. 9 fig, 1 tab, 14 ref.

Descriptors: *Saline water-freshwater interfaces, *Finite element analysis, *Confined water, Saline water intrusion, Groundwater, Pumping, Aquifer characteristics, Anisotropy, Mathematical studies, Computer programs, Dupuit-Forchheimer theory, Porous media, Model studies.
Identifiers: Hele-Shaw model.

The finite element method of solution for the steady interface of saline and fresh water is capable of overcoming the limitations imposed on other methods by their need for approximations such as Dupuit flow and regular geometry. The versatility of the method is illustrated by obtaining solutions for the steady interface, the steady interface subject to pumping from a well in the aquifer, and the steady interface in an anisotropic medium. The results for the steady interface in a confined homogeneous isotropic aquifer with and without a pumping well were verified experimentally by using a Hele-Shaw model. The corresponding anisotropic case was not experimentally tested, but results were consistent with the expected effects of anisotropy. (CSIRO)
W75-02182

2G. Water In Soils

SEEPAGE THROUGH SOIL BEDDING OR A HILLSIDE DUE TO A STEADY RAINFALL,
British Columbia Univ., Vancouver. Dept. of Geological Sciences.
R. A. Freeze, J. Toth, P. A. Witherspoon, M. S. Selim, and D. Kirkham.
Soil Sci Soc Am Proc, Vol 37, No 5, p 811-812, 1973, Illus.

Descriptors: *Groundwater, *Hydrogeology, Rainfall, Soils, *Seepage.

The recent 2-part paper by Selim and Kirkham (1972a, 1972b) was published without an apparent knowledge of some earlier work in the groundwater hydrology field by Toth (1962, 1963) and Freeze and Witherspoon (1966, 1967, 1968). This earlier work could easily be considered as a foundation for Selim and Kirkham's study. The contents of these papers and their relationship to Selim and Kirkham's work are discussed. A reply to the letter is also published.--Copyright 1974, Biological Abstracts, Inc.
W75-01665

SOIL MOISTURE RETENTION AND HYSTERETIC EFFECTS IN FOUR TEXTURALLY DIFFERENT SOILS OF MADHYA PRADESH,
Jawaharlal Nehru Agricultural Univ., Jabalpur (India). Dept. of Soil Science and Agricultural Chemistry.
R. K. Gupta, and J. S. Yadav.
JNKVV (Jawaharlal Nehru Krishi Vishwa Vidyalaya) Res J, Vol 7, No 2, p 79-85, 1973, Illus.

Descriptors: Soils, Moisture, *Soil moisture, Clays, Clay loam, Loam, *Specific retention.
Identifiers: Madhya, Pradesh, *India, Sandy clay loam, Sandy loam.

Four soil types clay, clay loam, sandy clay loam and sandy loam from Jabalpur India, were studied for their moisture retention characteristics in the range of 0.15 atm. The moisture retention curves were determined for disturbed and undisturbed samples. In all soil types most of the moisture was released below the suction of 7 atm. The relative positions of the retention curves at high suctions were determined by clay content and at relatively low suctions by silt and sand content. The disturbed soil samples retained higher moisture content at suctions lower than 1/3 atm in case of clay loam and about the same in case of sandy clay loam and sandy loam. A comparison of moisture desorption and moisture adsorption curves observed within 1 atm suction indicated that the coarse textured soils were more hysteretic than the fine textured soils, although all soil types exhibited considerable hysteresis.--Copyright 1974, Biological Abstracts, Inc.
W75-01668

THE SEASONAL VARIATION OF THE NUMBER OF MICROORGANISMS IN TWO PSEUDOGLEY-SOILS WITH DIFFERENT WATER CONTENTS, (IN GERMAN),
Bonn Univ. (West Germany). Institut fuer Bodenkunde.
For primary bibliographic entry see Field 5B.
W75-01678

INFLUENCE OF RAINFALL ON THE MORPHOLOGY OF SOME HUMID AND SUB-HUMID ZONAL SOILS IN NEW ZEALAND,
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Soil Bureau.
I. J. Pohlen.
N Z J Sci. Vol 16, No 1, p 101-112, 1973, Illus.

Descriptors: *Soils, *Rainfall, Precipitation(Atmospheric).
Identifiers: Allophane, Fulviform soils, Morphology, *New Zealand, Palliform soils, Sesqui oxides, Zonal soils.

Zonal soils from siliceous parent materials were studied. Palliform soils which have characteristically pale subsoils with a fragipan or similar compact formation occur below mean annual rainfalls of approximately 750-1000 mm, and fulviform soils which have yellower and more friable subsoils occur under higher rainfalls. The distribution of the soils is also modified by the distribution of rainfall; it is not influenced by rain days with less than 2.5 mm rain and is related to seasonal moisture and leaching rather than to seasonal dryness. In comparison with palliform soils the fulviform soils have markedly higher contents of 'free' sesquioxides and allophane (especially in the subsoil) and a lesser degree of orientation of their clay minerals, and they cannot be dispersed easily without treatments to diminish sesquioxides and allophaen. These differences in constitution are attributed to seasonal moisture and leaching and are responsible for the differences in morphology. Since they occur over a wide range of mean temperatures (3-16C), they appear to indicate a principle of general application in countries where similar differences in soil morphology are found.--Copyright 1974, Biological Abstracts, Inc.
W75-01680

SOIL SALINITY REDUCED BY SUMMER FALLOW AND CROP RESIDUES,
Agricultural Research Service, Mandan, N. Dak.
F. M. Sandoval, and L. C. Benz.
Soil Sci. Vol 116, No 2, p 100-105, 1973, Illus.

Descriptors: *Soils, Soil properties, *Salinity, *Saline soils, Crops, Fallowing, Leaching, Rotations.
Identifiers: Salinity control.

Soil salinity can frequently be reduced and controlled under dryland conditions of Northern Plains by proper use of dryland cultural practices that promote soil water conservation. Summer fallow significantly reduced salinity in the root zone, whereas salinity increased under a small grain crop. Soil salinity reductions attributed to fallow were greater under a deeper water table regime compared to more shallow water table conditions. A straw cover or small grain stubble mulch during the winter, in conjunction with summer fallow, led to further salinity reductions. The straw mulch was more effective in reducing salinity at a more severely saline and higher water table site than at a more moderate location. Summer fallow was more effective at the more moderate site compared to the severe location. Under the combination of summer fallow and winter vegetative mulch, precipitation in excess of evapotranspiration losses supplied water for leaching. Growing a crop, except during high rainfall periods, did not leave excess water. Summer fallow with winter vegetative residue management might be effectively utilized in the cultural rotation for reducing soil salinity under dryland conditions.--Copyright 1974, Biological Abstracts, Inc.

W75-01688

CHANGES IN THE MYCOFLORAS OF PASTURE SOILS AFTER LONG-TERM IRRIGATION,
Department of Scientific and Industrial Research, Wellington (New Zealand). Information Services.
For primary bibliographic entry see Field 3F.
W75-01689

MICROBIOLOGICAL AND ENZYMIC ACTIVITY OF DRAINED PEAT SOILS UNDER PINE STANDS, (IN RUSSIAN),
Belorusskii Tekhnologicheskii Institut, Minsk (USSR). Dept. of Soil Science Geology.
For primary bibliographic entry see Field 5B.
W75-01695

BEHAVIOUR OF DIFFERENT LENGTHS OF IRRIGATION FURROWS UNDER VARIABLE LAND SLOPES AND RATES OF DISCHARGES OF IRRIGATION WATER,
Indian Inst. of Tech., Kharagpur. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 3F.
W75-01697

EFFECT OF EVAPORATION DEPRESSORS ON SOIL MICROFLORA, (IN UKRANIAN).
Kiev State Univ. (USSR).
For primary bibliographic entry see Field 2D.
W75-01724

INFLUENCE OF HIGH APPLICATION OF SEMI-LIQUID MANURE AND THE USUAL MINERAL FERTILIZERS ON THE MINERAL CONTENT (NO3, NH4, P AND SO4) OF THE SOIL AND SUBSOIL WATER IN SANDY SOILS OF NORTHWEST GERMANY, (IN GERMAN),
Landwirtschaftskammer Weser-Ems, Oldenburg, W. Ger.
P. Foerster.
Z Acker Pflanzenbau. Vol 137, No 4, p 270-286. 1973.
Identifiers: Ammonium, Arable land, Fertilizers, Grassland, Land, Liquid, Minerals, Nitrates, Phosphorus, *Sandy soils, Soils, Sulfate, Water pollution sources, *West Germany, *Farm wastes.

The influence of a high rate of organic manuring in the form of a preparation of pig and hen semi-liquid manure (600 m3/ha), that of the usual mineral fertilizers on arable and pasture land and also the influence of unmanured grassland on the mineral content of the soil and subsoil water in a Pleistocene sand soil was studied. Samples of the soil and subsoil water were taken periodically in 1972 at different depths at 6 experimental sites. A high rate of manuring compared to the usual mineral fertilizers, led at first to a considerable accumulation of NO3-N in the soil water and the subsoil water close to the surface, which diminished in the course of the experiment. On manuring the nitrate content of the soil and exudates increased with depth. In the subsoil water there was a tendency for the NO3-N content to diminish with depth. The concentration of NH4-N and SO4-S in the soil and subsoil water was also increased considered by manuring the increase being greater with hen excrement than with that of pigs. High rates of manure led to an increase in P concentration down to a depth of 90 cm. In addition to the increase in concentration, the marked periodic fluctuations in concentration pointed to water pollution resulting from high applications of manure. With the usual mineral fertilizers, in grassland, compared with arable land, there was a reduced concentration of NO3-N down to 90 cm below the soil surface, the NH4-N being unchanged and the SO4-S concentration increased. In an O area of grassland that has not been manured since 1966, there was a markedly lower concentration of NO3-N and SO4-S in the soil and subsoil water compared with that receiving mineral fertilizers, whereas the P content was the same.--Copyright (c) 1974, Biological Abstracts, Inc.
W75-01742

PEAT PROPERTIES AND UNSATURATED HYDRAULIC CONDUCTIVITY OF PEAT SOILS, (IN GERMAN),
Niedersaechaisches Landesamt fuer Bodenforschung, Bremen (West Germany). Ausseninstitut fuer Moorforschung und Angewandte Bodenkunde.
R. Bartels, and H. Kuntze.
Z Pflanzenernaehr Bodenkd. Vol 134, No 2, p 125-135, 1973. Illus. English summary.
Identifiers: Flow, Density, Flux, *Hydraulic conductivity, *Peat, *Soils, Drainage.

Drainage of organic soils is closely connected with water supply of plants by the capillary fringe of the groundwater. Unsaturated flow of water was measured by the double-membrane apparatus (described by Vetterlein, modified for experiments with undisturbed peat samples). The influence of decomposition, nature of peat, ash content, bulk density (consolidation) and flux direction on unsaturated flow of water in peat soils was determined. The correlation to unsaturated water conductivity decreased in the sequence: decomposition, flux direction, ash content, bulk density. A dependence on bulk density exists only below pF 2.--Copyright 1974, Biological Abstracts, Inc.
W75-01761

ESTIMATION OF DAILY SOIL MOISTURE FOR WINTER WHEAT IN KANSAS,
Kansas State Univ., Manhattan. Dept. of Agronomy.
For primary bibliographic entry see Field 2D.
W75-01855

AXISYMMETRIC INFILTRATION IN SOILS, I. NUMERICAL TECHNIQUES FOR SOLUTION,
Utah Water Research Lab., Logan.
R. W. Jeppson.
Journal of Hydrology, Vol 23, No 1-2, p 111-130, 1974. 7 fig, 1 tab, 20 ref, 1 append.

Descriptors: *Infiltration, *Soil moisture, *Soil water movement, *Unsaturated flow, Percolating water, Darcys law, Pore water, Numerical analysis, Digital computers, Porous media, Diffusivity, Equations.
Identifiers: *Crank-Nicolson method, Alternating direction implicit method.

Numerical solutions were obtained to the transient, three-dimensional axisymmetric, unsaturated moisture movement through homogeneous soil due to infiltration over a horizontal circular surface area. Part I dealt with techniques for numerical solutions, the difficulties in achieving such solutions due to the strong nonlinearities of the equation of flow, and procedures which minimize such difficulties. In this part three adaptations of the Crank-Nicolson method, and three variations of the alternating direction implicit (ADI) method were studied and their solutions compared. Only those methods that evaluate the nonlinear coefficients on the advanced time planes fully implicitly yield solution in close agreement. Part II (Jeppson, 1974) compiled solutions from a number of problems in graphs relating some items of interest in infiltration to such problem specifications as size of circle of application and parameters describing the hydraulic properties of unsaturated soils. (Sanderson-ISWS)
W75-01990

A COUPLED HEAT AND MOISTURE TRANSPORT MODEL FOR ARCTIC SOILS,
Alaska Univ., College. Inst. of Water Resources.
For primary bibliographic entry see Field 2C.
W75-01992

A PREDICTOR-CORRECTOR METHOD FOR SOLVING THE CONVECTION-DISPERSION EQUATION FOR ADSORPTION IN POROUS MEDIA,
Maryland Univ., College Park. Dept. of Civil Engineering.
T. Tagamets, and Y. M. Sternberg.
Water Resources Research, Vol 10, No 5, p 1003-1011, October 1974. 9 fig, 23 ref.

Descriptors: *Adsorption, *Convection, *Dispersion, Numerical analysis, Fluid movement, Porous media, Saturated flow, Equations, Mathematical models, Mass transfer, Isotherms, Finite element analysis.
Identifiers: Predictor-corrector method.

The one-dimensional convection-dispersion equation subject to a nonlinear adsorption isotherm was formulated and solved by using a predictor-corrector finite difference scheme. The effects of convection, dispersion, and adsorption were illustrated for some typical values of variables encountered in 'real systems'. A comparison between the numerical results and some experimental data was also presented. (Gibb-ISWS)
W75-01998

HERBAGE PRODUCTION AND THE ACCUMULATION OF SOIL NITROGEN UNDER IRRIGATED PASTURES ON THE RIVERINE PLAIN,
Commonwealth Scientific and Industrial Research Organization, Deniliquin (Australia). Riverina Lab.
For primary bibliographic entry see Field 3F.
W75-02051

UTILITY OF A SIMPLE SOIL WATER BUDGET MODEL IN AGRONOMIC RESEARCH. 2. ESTIMATES OF AVAILABLE SOIL WATER IN RELATION TO PROFILE CHANGES OF SOIL WATER CONTENT AND POTENTIAL,
Sydney Univ., Narrabri (Australia). North West Wheat Research Inst.
R. G. Fawcett, and O. G. Carter.
Australian Journal of Experimental Agriculture and Animal Husbandry, Vol 14, No 66, p 80-84, February 1974. 3 fig, 2 tab.

Descriptors: *Soil water, *Fallowing, *Density, *Groundwater potential, *Soil profiles, Seedings, Dry farming, Hydrologic budget, Wheat, *Australia, Planting management.
Identifiers: *New South Wales(Aust).

Plant density, time of sowing and level of fallow water were varied in the growing season of spring wheat to determine their effects on profile changes in soil water content and potential. Plant density affected the depth and completeness of soil water extraction, especially below 60 cm, with water potential values reaching -15 in the zone of maximum water extraction (0-9 cm). Sowing late in the season resulted in shallower water being extracted because of limited root growth. With the level of fallow water less than 120 cm, the amount of soil water extracted was plant density independent, but when fallow water depth exceeded 120 cm, extraction of water in this deeper zone was dependent on both plant density and time of sowing. Recommendations for applying these results to planting practices in New South Wales are made, and limitations of a simple soil water budget are discussed in relation to the results. (Caldwell-Arizona)
W75-02056

AEROBIC WASTEWATER TREATMENT PROCESS WITH PARTIAL REUSE AND INFREQUENT DOSING TO SOIL,
Environment/One Corp., Latham, N.Y. (Assignee).

For primary bibliographic entry see Field 5D.
W75-02159

SHORT TERM EFFECT OF SOME METHODS FOR IMPROVING SOIL STRUCTURE IN RED-BROWN EARTH SOILS OF THE NORTHERN IRRIGATION AREAS, VICTORIA (AUSTRALIA).
Victorian Dept. of Agriculture (Australia). Irrigation Research Station.
For primary bibliographic entry see Field 3F.
W75-02165

SOIL AND WATER MANAGEMENT, A LOCAL AUTHORITY VIEWPOINT,
Shire Council, Pittworth (Australia).
For primary bibliographic entry see Field 6E.
W75-02186

SOIL AND WATER MANAGEMENT IN AREAS OF SOIL EROSION HAZARD,
Department of Primary Industries, Brisbane (Australia). Soil Conservation Branch.
For primary bibliographic entry see Field 4D.
W75-02187

2H. Lakes

A MATHEMATICAL MODEL OF A TWO-LAYER ECOLOGICAL LAKE SYSTEM, (IN RUSSIAN),
Akademiya Nauk SSSR, Leningrad. Institut Evolyutsionnoi Fiziologii i Biokhimii.
For primary bibliographic entry see Field 5C.
W75-01653

WATER POLLUTION OF BOUNDARY WATERS OF THE GREAT LAKES SYSTEM FROM AGRICULTURAL, FORESTRY AND OTHER LAND USE ACTIVITIES.
International Joint Commission-United States and Canada.
For primary bibliographic entry see Field 5G.
W75-01793

WATER POLLUTION OF LAKES SUPERIOR AND HURON.
International Joint Commission United States and Canada.
For primary bibliographic entry see Field 5G.
W75-01794

THE HELME RESERVOIR NEAR KELBRA (KYFFHAEUSER): II. LIMNOLOGICAL AND HYGIENIC RELATIONSHIPS IN THE PERIOD ENCOMPASSING 1968-1969, (IN GERMAN),
Martin Luther-Universitaet, Halle-Wittenberg (East Germany). Hygiene Institut.
For primary bibliographic entry see Field 5C.
W75-01839

WATER-LEVEL FLUCTUATIONS OF LAKES IN FLORIDA,
Geological Survey, Tallahassee, Fla.
G. H. Hughes.
Florida Bureau of Geology, Tallahassee, Map Series no 62, 1974. 1 sheet, 5 fig, 1 map, 2 ref.

Descriptors: *Water level fluctuations, *Water balance, *Lakes, *Florida, Surface-groundwater relationships, Artesian aquifers, Karst hydrology, Hydrogeology, *Maps.

Water-level fluctuations of some of the important lakes in Florida are shown on a map. As of 1972 lake-level records were being collected at 160 lakes. The range of fluctuation in level varies greatly among lakes: as small as 2 feet for some lakes, more than 30 feet for others. About 80 percent fluctuate 5 feet or more. Levels of lakes connected by a throughgoing stream tend to fluctuate together but the range of fluctuation may differ significantly. Levels of lakes in the same general area often fluctuate together, even though they are not connected by a throughgoing stream. One of the chief causes of differences in the magnitude of lake-level fluctuations is the variability in permeability of materials beneath the land surface. Other things being equal, a lake that receives water primarily from surface-water inflow will have a greater range of fluctuation than one that receives water primarily from groundwater inflow. Another factor that contributes greatly to differences in the magnitude of lake-level fluctuations is the relation between the lake level and the potentiometric surface of the confined aquifer. Lakes in recharge areas generally fluctuate more widely than do lakes in discharge areas. For any change in the hydrologic system of a lake, a reaction must take place somewhere in the system. Because of the relations and interrelations that exist between rainfall, runoff, lake levels, and groundwater levels, the hydrologic system of a lake must be adequately defined before effects of changes can be fully evaluated. (Knapp-USGS)
W75-01845

BATHYMETRY OF CANNIKIN LAKE, AMCHITKA ISLAND, ALASKA, WITH AN EVALUATION OF COMPUTER-MAPPING TECHNIQUES,
Geological Survey, Denver, Colo.
D. D. Gonzalez, L. E. Wollitz, and G. E. Brethauer.
Available from NTIS, Springfield, Va 22161 as USGS-474-203, $5.50 in paper copy, $2.25 in microfiche. Contract Report USGS-474-203 (Amchitka-41) for US Atomic Energy Commission, 1974. 24 p, 7 fig, 4 ref. USAEC Contract AT(29-2)-474.

Descriptors: *Nuclear explosions, *Bathymetry, *Lakes, *Alaska, *Mapping, Sounding, Limnology, Computer programs, Depth, Surveys, Data processing, Contours, Lake morphometry, Sonar.
Identifiers: *Bathymetric maps, *Amchitka Island(Alaska).

To determine the effect of a subsurface nuclear detonation on the hydrologic and biologic environment, it was necessary to define the characteristics of Cannikin Lake, Amchitka Island, Alaska. A bathymetric map, the basic geometry of lake, and the stage-area-volume relationship were derived from data produced by a sonic survey of the lake. At the lake's highest level, the maximum depth is 31 feet, the volume is 325 acre-feet, and the surface area is 30 acres. A computer-mapping technique utilizing two different computer programs (WET and Calcomp GPCP) was used to evaluate the usefulness of the programs as mapping tools. The two bathymetric maps of the lake bottom produced by this method show a high degree of reliability when compared with the hand-drawn version. (Knapp-USGS)
W75-01849

A NOTE ON SPRING WARMING IN LAKE SUPERIOR,
Texas Univ., Port Aransas. Inst. of Marine Science.
N. P. Smith.
Water Resources Bulletin, Vol 10, No 5, p 990-994, October 1974. 3 fig, 16 ref.

Descriptors: *Lake Superior, *Water temperature, Temperature, Seasonal, Thermal properties, Lakes, Bathymetry, Bathythermographs, Winter, Cooling, Surveying instruments, Surveys, Spring, Summer.
Identifiers: Thermal bar, Thermal recorder, Keweenaw Current.

Temperature recorder data from central Lake Superior obtained from May through July 1967 were used to describe the spring warming of this deep lake. Data from the 30, 91, and 150 m levels suggested that water descending in the thermal bar spreads lakeward, filling the lake with an increasingly thick layer of maximum density water. Lakeward of the thermal bar, local warming is relatively slow preceeding and following the passage of the reverse thermocline at a given level. (Terstriep-ISWS)
W75-01980

BAROCLINIC COASTAL JETS IN LAKE ONTARIO DURING IFYGL,
Woods Hole Oceanographic Institution, Mass.
G. T. Csanady, and J. T. Scott.
Journal of Physical Oceanography, Vol 4, No 4, p 524-541, October 1974. 14 fig, 2 tab, 12 ref.

Descriptors: *Lake Ontario, *Currents(Water), *Mathematical models, Great Lakes, Lake breezes, Circulation, Winds, Lakes, Surface waters, Jets, Summer, On-site investigations.
Identifiers: *Baroclinic coastal jets, Linear dynamic model, International Field Year on the Great Lakes.

Coastal current observations taken at five locations in Lake Ontario during the International Field Year for the Great Lakes (IFYGL), in periods of summer stratification, were presented and interpreted in terms of a linear dynamical model. Windstress impulses set up a pattern of flow characterized by baroclinic coastal jets, flowing initially from an upwind stagnation point along both shores to a downwind one. In time this flow pattern rotates slowly counterclockwise so that at certain fixed points on shore the coastal jet reverses direction and flows upwind. Several instances of this phenomenon were observed during IFYGL on the south shore of Lake Ontario, following west-southwest wind-stress impulses. Two episodes of this kind were analyzed in detail to show that there is qualitative accord between theory and observation, to the extent one might reasonably expect from the simplified model. (Jess-ISWS)
W75-01984

VERIFICATION OF NUMERICAL MODELS OF LAKE ONTARIO: PART I. CIRCULATION IN SPRING AND EARLY SUMMER,
Canada Centre for Inland Waters, Burlington (Ontario).
T. J. Simons.
Journal of Physical Oceanography, Vol 4, No 4, p 507-523, October 1974. 12 fig, 24 ref, 1 append.

Descriptors: *Lake Ontario, *Water levels, *Temperature, *Water circulation, *Model studies, Hydrodynamics, Synoptic analysis, Wind pressure, Data collections, Diffusion, Mathematical studies, Simulation analysis, Numerical analysis, Great Lakes.
Identifiers: *1972 International Field Year, *Storm Agnes, Inertial oscillations.

Data from the 1972 International Field Year on Lake Ontario were used to test the performance of three-dimensional hydrodynamical models of large lakes. The models varied with regard to computational details, but their common purpose was to predict water levels, currents, and temperatures in the Great Lakes on the basis of prescribed atmospheric conditions. The period of observations covered the passage of tropical storm Agnes during the latter part of June 1972. Data from the meteorological buoy network on Lake Ontario were combined with routine observations at first-order synoptic stations around the lake to obtain hourly values of wind-stress and pressure fields. Verification of model results was based on hourly values of water level data from stations. Satisfactory simulations of observed water levels and currents required wind-stress coefficients considerably larger than those obtained from direct flux measurements. Short-term variations of verti-

cal current profiles at individual stations can be modeled adequately by recourse to classical dynamic stability theories. Whereas inertial oscillations are governed largely by the magnitude of the vertical diffusion of momentum, the internal fluxes of momentum can be varied by an order of magnitude without changing the character of the solutions for time scales of a day or more. (Singh-ISWS)
W75-01987

MERCURY DISTRIBUTION IN AMERICAN SMELT FROM LAKE MICHIGAN,
Univ. Wis.-Parkside, Kenosha, Sci. Div.
For primary bibliographic entry see Field 5B.
W75-02043

INVESTIGATIONS OF THE FAUNA OF THE LITTORAL ZONE OF THE EUTROPHIC SEMPACHERSEE, (IN GERMAN),
For primary bibliographic entry see Field 5C.
W75-02062

BACTERIAL GRADIENTS AT THE SEDIMENT: WATER INTERFACE OF SHALLOW LAKES,
Magyar Tudomanyos Akademia, Tihany. Biological Research Inst.
For primary bibliographic entry see Field 5B.
W75-02065

SEASONAL CHANGE OF THE ORGANIC CARBON CONTENT OF LAKE BALATON DURING 1972,
Magyar Tudomanyos Akamedia, Tihany. Biological Research Inst.
For primary bibliographic entry see Field 5B.
W75-02093

SOME REMARKS ON THE METHOD OF PRODUCTION ESTIMATION,
Akademiya Nauk SSSR, Leningrad. Zoologicheskii Institut.
M. B. Ivanova.
Pol Arch Hydrobiol, Vol 20, No 3, p 435-441, 1973, Illus.
Identifiers: *Crustaceans, Lakes, *Plankton production, *Poland(Lake Jeziorak), *Zooplankton, Winberg method.

The paper comprises the polemics against the paper by W. Zawislak on the production of crustacean zooplankton in Moty Bay, Lake Jeziorak, Poland, in which a modification of the Winberg method of production calculation was presented.--Copyright 1974, Biological Abstracts, Inc.
W75-02097

THE LIMNOLOGY OF A THERMAL LAKE, LAKE ROTOWHERO, NEW ZEALAND: I. GENERAL DESCRIPTION AND WATER CHEMISTRY,
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Ecology Div.
For primary bibliographic entry see Field 5B.
W75-02099

RECONNAISSANCE BATHYMETRY OF PYRAMID LAKE, WASHOE COUNTY, NEVADA,
Geological Survey, Carson City, Nev.
For primary bibliographic entry see Field 7C.
W75-02121

HYDROLOGIC REGIMEN OF WALKER LAKE, MINERAL COUNTY, NEVADA,
Geological Survey, Carson City, Nev.
For primary bibliographic entry see Field 7C.
W75-02122

2I. Water In Plants

EVALUATING GROWTH POTENTIAL AFTER DROUGHT STRESS,
California Univ., Davis. Dept. of Agronomy and Range Science.
For primary bibliographic entry see Field 3F.
W75-02050

CHANGES IN THE STOMATAL RESPONSE CHARACTERISTICS OF GRAIN SORGHUM PRODUCED BY WATER STRESS DURING GROWTH,
Texas A and M Univ., College Station. Dept. of Soil and Crop Sciences.
For primary bibliographic entry see Field 3F.
W75-02052

DESERT PLANT CHEMURGY: A CURRENT REVIEW,
Agricultural Research Service, Weslaco, Tex. Foods Crops Utilization Research Lab.
R. R. Cruse.
Economic Botany, Vol 27, No 2, p 210-230, April-June 1973. 1 tab, 236 ref.

Descriptors: *Desert plants, *Land use, *Southwest US, *Semi-arid climates, Economics, Chemical industry, Xerophytes, Chemicals, Arroyos, Erosion, Erosion control.
Identifiers: *Chemurgy, *Plant uses.

A review of research and development of desert plant products is presented. Work is reported in pharmaceuticals, cosmetics, cellulose and fibers, stock feeds, plant growth regulators, sterols, oils and oilseeds, surfactants, waxes, and miscellaneous extractives. Possibilities and problems of cultivation are considered. Dramatic increases in land values in the Southwest indicate the need for economic studies in addition to chemical and biological studies for chemurgic utilization of xerophytic plants. Some extractives from these plants are amenable to machine harvesting and processing, others require considerable hand labor. In land adjacent to floodways such as arroyos the presence of xerophytic plants might assist in preventing excess erosion. A need for a systematic correlation of all factors when considering the utilization of desert plants. (Mastic-Arizona)
W75-02053

VISUAL ASSESSMENT OF TOTAL PLANT RELATIVE WATER CONTENT, WITH THE AID OF PHOTOGRAPHIC STANDARDS AS A GUIDE TO SCHEDULING IRRIGATION,
Western Australian Dept. of Agriculture, Bunbury. District Office.
For primary bibliographic entry see Field 3F.
W75-02055

INTERCEPTION OF RAINFALL BY KAMAHI (WEINMANNIA RACEMOSA) AT TAITA, NEW ZEALAND,
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Soil Bureau.
R. J. Jackson, and R. Aldridge.
N Z J Sci. Vol 16, No 3, p 573-590, 1973. Illus.
Identifiers: *Kamahi, *New Zealand(Taita), Rainfall interception(Plants), Stemflow, Weinmannia-racemosa, Trees.

Throughfall and stemflow were measured in 2 standa of kamahi (W. racemosa) in which the trees were 6 -8 m tall and about 50 yr old. Good agreement was obtained between the results for the 2 stands. Over the 23 mo. period of measurements, 47.8% of the gross rainfall above the stands reached the ground as throughfall and 25.3% as stemflow. Throughfall commenced when gross rainfall exceeded 1.0 mm; when gross rainfall exceeded 5 mm, about 50% of it reached the ground as throughfall. Stemflow commenced when gross rainfall exceeded 1.5 mm and became increasingly important as storm size increased. When gross rainfall exceeded 18 mm, 30% of it reached the ground as stemflow. Total interception loss over the period was 567 mm, or 26.9% of gross rainfall. Monthly values of interception loss were compared with potential evaporation from open water and from wet vegetation, and were generally consistent with the latter.--Copyright 1974, Biological Abstracts, Inc.
W75-02079

2J. Erosion and Sedimentation

COMPOSITION OF FREE LIPIDS IN SEDIMENTS OF THE TROPICAL WEST PACIFIC AND SOUTH ATLANTIC (SOSTAV SVOBODKYKH LIPIDOV DONNYKH OSADKOV ZAPADNOY TROPICHESKOY CHASTI TIKHOGO I YUZNOY CHASTI ATLANTICHESKOY OKEANOV),
For primary bibliographic entry see Field 5A.
W75-01744

SUSPENDED- AND BEDLOAD-SEDIMENT TRANSPORT IN THE SNAKE AND CLEARWATER RIVERS IN THE VICINITY OF LEWISTON, IDAHO, JULY, 1973 THROUGH JULY, 1974,
Geological Survey, Boise, Idaho.
W. W. Emmett, and H. R. Seitz.
Second Annual Basic-Data Report, 1974. 76 p, 29 fig, 14 tab, 5 ref.

Descriptors: *Pre-impoundment, *Baseline studies, *Sediment transport, *Design criteria, *Levees, *Idaho, Basic data collections, Hydrologic data, Sediment load, Streamflow, Bed load, Planning.
Identifiers: *Snake River(Idaho), *Clearwater River(Idaho), Lewiston(Idaho).

Backwater on the Snake River and Clearwater River arms of the pending (1975) impoundment of water in back of Lower Granite Dam being constructed by the Corps of Engineers, Walla Walla District, will necessitate construction of levees in the Lewiston, Idaho area. Sediment-transport characteristics and hydraulic- and channel-geometry data are presented for use in computer modeling aimed at defining design height of the levees. This report is a summary of information collected during the period July 1973 through July 1974. It is the second in a series of annual basic-data reports designed to make data available on a timely basis. The first report (Emmett and Seitz, 1973) presented a summary of information collected during the period March 1972 through June 1973. For both rivers, the volumes of runoff in the spring of 1974 were considerably greater than normal, and peak flows were among the highest of record. Thus, data of this report greatly extend the reliability of data presented in the 1973 report. (Knapp-USGS)
W75-01842

BASE AND THICKNESS OF THE POST-EOCENE CONTINENTAL DEPOSITS IN THE SACRAMENTO VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
R. W. Page.
Water-Resources Investigations 45-73, September 1974. 16 p, 3 fig, 36 ref.

Descriptors: *Aquifers, *California, *Stratigraphy, Structural geology, Gravels, Sands, Silts, Clays, Sedimentary rocks, Igneous rocks, Faults(Geologic), Folds(Geologic)
Identifiers: *Sacramento Valley(Calif).

The Sacramento Valley, which forms most of the northern one-third of the Central Valley of California, is a broad structural trough. Beneath

most places in the valley, the base of the post-Eocene continental deposits is equivalent to the base of the Tehama Formation of Pliocene age, which in some places at least may be of late Oligocene and early Miocene age. The deposits consist of intercalated beds of gravel, sand, silt, clay, tuff, conglomerate, sandstone, siltstone, and claystone. Beneath large areas along the eastern side of the valley the deposits consist of basaltic and andesitic mudflows, tuff, tuff breccias, volcanic sandstones and conglomerates, and sand and gravel, as well as overlying nonvolcanic sediments. They contain most of the fresh groundwater in the valley. The structure of the base of the continental deposits is a large northward-trending syncline whose trend is interrupted only by the Sutter Buttes. In the subsurface, faulting has occurred mostly within the basal part of the deposits. Beneath the northeastern part of the valley, along the Chico monocline, faulting has occurred through the total thickness of the deposits. The deposits range in thickness from zero near the margins of the valley to about 3,500 feet beneath the south-central part of the valley. The thickest sections occur along the axis of the syncline, but near Sutter Buttes the deposits are thinner than at any other locale near the central part of the valley. (Knapp-USGS)
W75-01844

COMPARISON OF ELEMENTAL ACCUMULATION RATES BETWEEN FERROMANGANESE DEPOSITS AND SEDIMENTS IN THE SOUTH PACIFIC OCEAN,
Rosenstiel School of Marine and Atmospheric Science, Miami, Fla.
T. Kraemer, and J. C. Schornick.
Chemical Geology, Vol 13, No 3, p 187-196, July 1974. 3 fig, 3 tab, 19 ref.

Descriptors: *Sedimentation, *Chemical precipitation, *Pacific Ocean, *Manganese, Iron, Copper, Water chemistry, Bottom sediments, Mineralogy.
Identifiers: *Manganese nodules.

Rates of accumulation of Fe and Mn, as well as Cu, Ni, Co, Pb, Zn, Hg, U and Th were determined for five ferromanganese deposits from four localities in the South Pacific Ocean. Manganese is accumulating in nodules and crusts at a rate roughly equivalent to its rate of accumulation in sediments in the same area. Iron shows a deficiency in accumulation in nodules and crusts with respect to sediments, especially near the continents, but also in the central and south-central Pacific. Copper is accumulating in nodules and crusts at a rate one order of magnitude less than in the surrounding sediments. This is interpreted as meaning that most of the Mn is supplied as an authigenic phase to both sediments and nodules while Fe is supplied mostly by ferromanganese micronodules and by detrital and adsorbed components of sediments; Cu is enriched in sediments relative to nodules and crusts probably through biological activity. (Knapp-USGS)
W75-01851

STAGES OF DEVELOPMENT OF GULLIES IN WESTERN UNITED STATES OF AMERICA,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 4D.
W75-01861

FUNCTIONAL RELATIONSHIPS AND A COMPUTER PROGRAM FOR STRUCTURAL GULLY CONTROL,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
B. H. Heede, and J. C. Mufich.
Journal of Environmental Management, Vol 1, p 321-344, 1973. 8 fig, 5 ref.

Descriptors: *Gully erosion, *Erosion control, *Check structures, Sedimentation, *Sediment control, *Channel improvement, *Mathematical models, *Computer programs, Bank protection, Deposition(Sediments), Soil conservation, Watershed management, Land reclamation, *Colorado, *New Mexico, Arizona, *Rocky Mountain region.
Identifiers: Check dams.

Effective check dam height is one of the most important design criteria in gully control because it influences spacing of dams, materials, and total cost of treatments. In a given gully there is one optimum dam height at which total treatment costs are lowest and volume requirements for rock smallest. Relations are presented between effective dam height and volume of material, cost, structural spacing, required number of dams, expected sediment deposits, and sediment value-treatment cost ratio. Design recommendations are given for selected treatment objectives. Computer programs developed, requiring a minimum of data, consist of two phases. Outputs are in tabular and graphical forms. Phase I can yield different choices for design. In this case, it serves as a basis for decision-making. If used without Phase II, it can serve inventory purposes. Phase II selects the final design of the individual dams as well as the treatment. A sample output is appended. The program was proved to be operational in field tests. (Forest Service)
W75-01864

TOTAL SEDIMENT DISCHARGE SAMPLING OVER SILLS,
Forest Service (USDA), Cadillac, Mich. North Central Forest Experiment Station.
E. A. Hansen.
Water Resources Research, Vol 10, No 5, p 989-994, October 1974. 5 fig, 2 tab, 8 ref.

Descriptors: *Sediment discharge, *Sampling, *Bed load, *Sands, Roughness(Hydraulic), Turbulence, Streams, Sediment load, Bed load samplers, Measurement, Discharge measurement, On-site data collections, Channels, Currents(Water).
Identifiers: *Wooden sills, *Equal transit rate.

Described were (1) the method of installation of wooden sills on the bed of streams, (2) collection of bed load sediment data at the sills, (3) analysis of the bed load sediment data, and (4) comparison of these results with bed load sediment data collected at stream beds where sills were not installed. It was indicated that wooden sills permit collection of bed load sediment normally missed in the unsampled zone. The advantages associated with bed load data collected at sills were; (1) sills provide a rigid unchanging control at which to sample, (2) they reduce the chance of sample bias from sediment stirred up by the wader, and (3) they permit control of the sampling interval because the sample points can be marked directly on the sills. Analysis of the field data indicated that in all probability the 'sill samples' provided better measurements of total sediment discharge than the traditional stream samples. The nonuniformity of bed load discharge in the stream cross-section complicated the problem of obtaining an unbiased sample of the total sediment discharge. (Bhowmik-ISWS)
W75-01986

SEDIMENT TRANSPORT IN TIDAL RIVER,
Calcutta Port Commissioners (India).
For primary bibliographic entry see Field 2L.
W75-01997

DEPOSITION OF DEEP-SEA MANGANESE MODULES,
Pennsylvania State Univ., University Park. Ore Deposits Research Section.
For primary bibliographic entry see Field 5B.
W75-02095

THE EFFECTS OF THE HURRICANE AGNES FLOOD ON CHANNEL GEOMETRY AND SEDIMENT DISCHARGE OF SELECTED STREAMS IN THE SUSQUEHANNA RIVER BASIN, PENNSYLVANIA,
Geological Survey, Harrisburg, Pa.
J. R. Ritter.
Journal for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 Price $2.75. Journal of Research of the U.S. Geological Survey, Vol 2, No 6, p 753-761, November-December 1974. 6 fig, 6 tab, 12 ref.

Descriptors: *Floods, *Erosion, *Sedimentation, *Pennsylvania, *California, Sediment transport, Geomorphology, Sediment yield, Deposition(Sediments).
Identifiers: *Susquehanna River basin(Pa).

The Hurricane Agnes flood hardly changed the channel geometry of streams in the Susquehanna basin of Pennsylvania. In 10 sites studied, the width of the stream channels was changed little by the flood and streambed altitudes were lowered less than a foot. The velocity of the streams at a given discharge had decreased. In comparison, the sediment deposited by the December 1964 flood in northwestern California commonly raised the streambed altitudes several feet. The differences in the effects of the two floods may have been related to the availability of sediment for transport, to the relative size of sediment carried in suspension or bedload, and to the relative magnitudes of the floods. The Hurricane Agnes flood of June 20-24, 1972, was the largest historical flood ever to hit parts of Pennsylvania and adjoining States. During the flood, many Pennsylvania streams carried as much suspended sediment as they usually carry in 2-7 yr. (Knapp-USGS)
W75-02139

2K. Chemical Processes

HIGH PRECISION DETERMINATION OF CALCIUM IN THE PRESENCE OF HIGHER CONCENTRATIONS OF MAGNESIUM BY MEANS OF A COMPUTERIZED PHOTOMETRIC TITRATION - APPLICATION TO SEA WATER,
Goteborg Univ. (Sweden). Dept. of Analytical Chemistry.
D. Jagner.
Analytica Chimica Acta, Vol 68, No 1, p 83-92, January, 1974. 4 fig, 2 tab, 20 ref.

Descriptors: *Calcium, *Sea water, *Analytical techniques, *Photometry, *Automation, Magnesium, Volumetric analysis, Computers, On-site experiments, Pollutant identification.

A computerized photometric titration procedure for the determination of calcium in the presence of magnesium with zinc-zincon as the indicator was described. The evaluation method was based on straight-line regression, the method yielding a relative precision of 0.00028 when applied to sea water in the salinity range 5-35%. The accuracy of the titration procedure depends on the accuracy of the calcium concentration in the standard solution and on how closely the ionic composition of the standard resembles that of sea water. (Jernigan-Vanderbilt)
W75-01658

NONDISPERSIVE SOFT X-RAY FLUORESCENCE SPECTROMETER FOR QUANTITATIVE ANALYSIS OF THE MAJOR ELEMENTS IN ROCKS AND MINERALS,
California Univ., Berkeley. Lawrence Berkeley Lab.
A. J. Hebert, and K. Street, Jr.
Analytical Chemistry, Vol 46, No 2, p 203-207, February, 1974. 5 fig, 2 tab, 8 ref.

Descriptors: *Analytical techniques, *Rocks, *X-ray, *Trace elements, Spectroscopy, Mineralogy, Fluorescence, Magnesium, Aluminum, Tin, Silver, Nickel.

A lithium drifted silicon detector and a multichannel analyzer system were combined with a multiple anode soft x-ray generator and a high vacuum sample handling system to provide an x-ray fluorescence unit for quantitative analyses of the elements from oxygen to iron. Analyses of three separately prepared sets of six USGS standard rock powders indicated reproducibility and accuracy on the order of 1 to 2% for eight major elements when calibrated against published wet chemical results. The reported values were obtained with a 5-minute average analysis time per element, or 40 minutes per sample. The deviations in the three sets were in agreement with the expected statistical uncertainties. Also described were a relatively rapid, accurate, and reproducible preparation technique and a method for sample matrix absorption corrections. (Jernigan-Vanderbilt)
W75-01663

POSSIBILITIES OF WATER DATING BY MEANS OF INERT GAS ISOTOPES (AUBSLICK AUS DIE WASSERDATIERUNG MIT HILFE VON EDELGASISOTOPEN),
Bern Univ. (Switzerland). Physiologisches Institut.
H. Oeschger, and A. Gugelmann.
Oesterreichische Wasserwirtschaft, Vol 26, No 3/4, p 54-56, April, 1974. 2 fig, 2 tab, 7 ref.

Descriptors: *Argon, *Krypton radioisotopes, Hydrology, Turbulence, Oceans, Water sampling, Glaciers, Isotopes, *Analytical techniques, Pollutant identification.
Identifiers: *Water dating, *Inert gas isotopes.

Possibilities of water dating in hydrology, oceanology and glaciology by means of inert gas isotopes, and actual dating performed by this method are described. The inert gas isotopes suitable for dating water of different ages are 37Ar, 39Ar, 81Kr, and 85Kr with the respective half-life periods of 35 days; 269 yrs; 210,000 yrs, and 10.6 yrs. For water dating, the water sample is first heated to 85-100 C under atmospheric pressure for the separation of the gases. Krypton and argon are then separated from oxygen and nitrogen by oxidation of the latter over hot copper followed by fractionated distillation. Argon and krypton are then separated from each other by a chromatographic method. The radioactivity is measured by means of proportional counter. Water dating by means of such inert gas isotopes is suitable for the determination of the age and age distribution of water, of the motion and turbulence of water masses in oceans, and of the age of different layers of glaciers. (Takacs-FIRL)
W75-01739

COMPOSITION OF FREE LIPIDS IN SEDIMENTS OF THE TROPICAL WEST PACIFIC AND SOUTH ATLANTIC (SOSTAV SVOBODKYKH LIPIDOV DONNYKH OSADKOV ZAPADNOY TROPICHESKOY CHASTI TIKHOGO I YUZNOY CHASTI ATLANTICHESKOY OKEANOV),
For primary bibliographic entry see Field 5A.
W75-01744

TEMPERATURE AND CHEMICAL DATA FOR SELECTED THERMAL WELLS AND SPRINGS IN SOUTHEASTERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
W. R. Moyle, Jr.
Water-Resources Investigations 33-73, Jun 1974. 12 p, 1 fig, 3 tab, 16 ref.

Descriptors: *Thermal water, *Thermal springs, *California, *Water chemistry, Data collections, Hydrologic data, Hydrogeology, Geothermal studies, Hydrothermal studies.

Data on temperature and chemical quality are listed for 95 thermal wells or springs in southeastern California that contain water in excess of 38 deg C. The highest temperature listed is 280 deg C. The general location of areas of thermal groundwater; the range of temperatures; data on the chemical quality, pointing out some of the constituents that may be detrimental to its use; and a map showing the locations of selected thermal wells and springs with relation to the public land net and cultural features are provided. Many of these wells and springs are alined along and associated with fault zones, or are located in the Imperial Valley where high temperature groundwater is found. (Knapp-USGS)
W75-01814

WATER RESOURCES DATA FOR NEBRASKA, 1972: PART 2. WATER QUALITY RECORDS.
Geological Survey, Lincoln, Nebr.
For primary bibliographic entry see Field 5A.
W75-01818

WASTE-LOAD ALLOCATION STUDIES FOR ARKANSAS STREAMS, RED RIVER BASIN, MOUNTAIN FORK, SEGMENT 1D,
Geological Survey, Little Rock, Ark.
For primary bibliographic entry see Field 5B.
W75-01841

POSSIBILITY OF A QUANTITATIVE DETERMINATION OF TWO CHEMICAL ANALOGS WITHOUT PRELIMINARY SEPARATION, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Geokhimii i Analiticheskoi Khimii.
For primary bibliographic entry see Field 5A.
W75-01848

COMPARISON OF ELEMENTAL ACCUMULATION RATES BETWEEN FERROMANGANESE DEPOSITS AND SEDIMENTS IN THE SOUTH PACIFIC OCEAN,
Rosenstiel School of Marine and Atmospheric Science, Miami, Fla.
For primary bibliographic entry see Field 2J.
W75-01851

REMOVAL OF PHENOLS FROM POLLUTED WATERS,
Rutgers-The State Univ., New Brunswick, N.J.
For primary bibliographic entry see Field 5D.
W75-01857

RADIOCHEMICAL ANALYSIS FOR PB-210 AND PO-210 IN ENVIRONMENTAL SAMPLES,
New Mexico Highlands Univ., Las Vegas. Inst. of Scientific Research.
For primary bibliographic entry see Field 5B.
W75-01858

NEW METHODS FOR THE PREPARATION OF PERCHLORATE ION-SELECTIVE ELECTRODES,
Louisiana State Univ., New Orleans. Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-01860

ELECTROKINETIC AND CHEMICAL ASPECTS OF WATER FILTRATION,
IIT Research Inst., Chicago, Ill.
For primary bibliographic entry see Field 5D.
W75-01896

AN HISTORICAL LOOK AT THE WATER QUALITY OF THE DELAWARE RIVER ESTUARY TO 1973,
Academy of Natural Sciences of Philadelphia, Pa. Dept. of Limnology.
For primary bibliographic entry see Field 5B.
W75-02001

ENZYMATIC DETERMINATION OF ZINC BELOW ONE PART PER BILLION,
Geneva Univ. (Switzerland). Dept. of Biochemistry.
For primary bibliographic entry see Field 5A.
W75-02060

CATALYTIC DETERMINATION OF TRACE AMOUNTS OF VANADIUM BY MEANS OF THE CHROMOTOPIC ACID-BROMATE REACTION,
Yamanashi Univ., Kofu (Japan). Dept. of Applied Chemistry.
For primary bibliographic entry see Field 5A.
W75-02063

DETERMINATION OF CADMIUM IN AIR PARTICULATES BY FLAMELESS ATOMIC ABSORPTION SPECTROMETRY WITH A GRAPHITE TUBE,
Ghent Rijksuniversiteit (Belgium). Instituut voor Nukleaire Wetenschappen.
For primary bibliographic entry see Field 5A.
W75-02064

THE USE OF AUXILIARY COMPLEXING AGENTS IN THE DIFFERENTIAL COMPLEXIMETRIC TITRATION OF ZINC AND CADMIUM WITH THERMOMETRIC END-POINTS,
Nagoya Inst. of Tech., Nagoya (Japan).
For primary bibliographic entry see Field 5A.
W75-02072

INTERFERENCE OF ALUMINUM IN THE ATOMIC ABSORPTION DETERMINATION OF CADMIUM USING SODIUM DIETHYLDITHIOCARBAMATE AS CHELATING AGENT,
Abbott Labs., North Chicago, Ill. Analytical Research Dept.
For primary bibliographic entry see Field 5A.
W75-02074

DETERMINATION OF COPPER IN COMPLEX MATRICES BY NEUTRON ACTIVATION ANALYSIS USING X-RAY DETECTION,
Virginia Univ., Charlottesville. Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-02075

HOT ATOMIC ABSORPTION SPECTROMETRY METHOD FOR THE DETERMINATION OF MERCURY AT THE NANOGRAM AND SUBNANOGRAM LEVEL,
National Cancer Inst., Frederick, Md. Frederick Cancer Research Center.
For primary bibliographic entry see Field 5A.
W75-02078

APPLICATION OF A DEMOUNTABLE HOLLOW CATHODE LAMP AS A SOURCE FOR THE DIRECT DETERMINATION OF SULFUR, IODINE, ARSENIC, SELENIUM, AND MERCURY BY ATOMIC ABSORPTION FLAME SPECTOMETRY,
Imperial Coll. of Science and Technology, London (England). Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-02080

ACCURATE DETERMINATION OF TEN MAJOR AND MINOR ELEMENTS IN SILICATE ROCKS BASED ON SEPARATION BY CATION EXCHANGE CHROMATOGRAPHY ON A SINGLE COLUMN,
National Chemical Research Lab., Pretoria (South Africa).
F. W. E. Strelow, C. J. Liebenberg, and A. H. Victor.
Analytical Chemistry, Vol 46, No 11, p 1409-1414, September, 1974. 8 tab, 5 fig, 18 ref.

Descriptors: *Separation techniques, *Trace elements, Rocks, *Silicates, *Chromatography, *Cation exchange, Aluminum, Iron, Calcium, Magnesium, Manganese, Chemical analysis, Pollutant identification.

A method was developed for the quantitative separation and accurate determination of Al, total Fe, Ti, Ca, Mg, Mn, Na, K, V, and Zr in synthetic mixtures and applied to silicate rock samples. Only a single column of AG 50W-X8 sulfonated polystyrene cation exhange resin was used and the elements were eluted by stepwise changing eluting agents. Ti(IV) and Zr appeared in the same eluent fraction, but could be determined spectrophotometrically without interference. All other elements were completely separated from each other and determined very accurately be selected known analytical procedures. Recoveries for major amounts were 100.0+ 0.1% or better for Al, Fe, Ca, Mg, Mn, and V and 100.0+ 0.2% or better for Ti, Na, and K. Recoveries for Zr were only about 98% because Hf is not eluted together with Zr. Relevant distribution coefficients, elution curves, results for two synthetic mixtures and six standard rock samples, and a method for the separation of trace amounts of V in rocks from accompanying impurities were presented. (Jernigan-Vanderbilt)
W75-02081

THE APPLICATION OF ELECTRODEPOSITION TECHNIQUES TO FLAMELESS ATOMIC ABSORPTION SPECTROMETRY-PART I. THE DETERMINATION OF CADMIUM WITH A TUNGSTEN FILAMENT,
Oslo Univ. (Norway). Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-02085

ATOMIC ABSORPTION SPECTROSCOPY-STAGNANT OR PREGNANT,
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Chemical Physics.
A. Walsh.
Analytical Chemistry, Vol 46, No 8, p 698A-708A, July, 1974. 8 fig, 17 ref.

Descriptors: *Spectroscopy, *Analytical techniques, *Trace elements, Research and development, *Pollutant identification, Chemical analysis.
Identifiers: *Atomic absorption spectroscopy.

In a speech at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, Ohio, March 6, 1974, the developer of atomic absorption spectroscopy discussed the development of the instrument since its inception in 1952 and reminisce over some of the problems encountered in making it a dependable analytical instrument and getting it accepted. The instrument has been in a pregnant form in the past decades and is now on the verge of giving birth to a new offspring which can analyze solids as well as solutions. This has been accomplished in a prototype instrument which atomizes by using cathodic sputtering. (Jernigan-Vanderbilt)
W75-02087

THE SORPTION OF SILVER BY POORLY CRYSTALLIZED MANGANESE OXIDES,
Geological Survey, Denver, Colo.
B. J. Anderson, E. A. Jenne, and T. T. Chao.
Geochimica et Cosmochimica Acta, Vol 37, p 611-622, 1973. 6 fig, 3 tab, 32 ref.

Descriptors: *Silver, *Manganese, *Sediments, *Sorption, Chemical reactions, Oxides, Inorganic compounds, Laboratory tests.

The sorption of silver by poorly crystallized manganese oxides was studied using synthesized samples of three members of the manganous manganite (birnessite) group, of different chemical composition and crystallinity, and a poorly organized gamma MnO2. All four oxides sorbed significant quantities of silver. The manganous manganites showed the greatest sorption while the gamma MnO2 showed the least. Sorption of silver was adequately described by the Langmuir equation over a considerable concentration range. The relationship failed at low pH values and high equilibrium silver concentrations. The sorption capacity showed a direct relationship with pH. However, the rate of increase of sorption capacity decreased at the higher pH values. Silver sorption maxima were not directly related to surface area but appeared to vary with the amount of occluded sodium and potassium present in the manganese oxide. The important processes involved in the uptake of silver by the four poorly crystallized manganese oxides are considered to be surface exchange for manganese, potassium and sodium as well as exchange for structural manganese, potassium and sodium. (Jernigan-Vanderbilt)
W75-02089

ELEMENTAL MERCURY EVOLUTION MEDIATED BY HUMIC ACID,
Georgia Univ., Athens. Dept. of Zoology.
For primary bibliographic entry see Field 5B.
W75-02090

PREDICTING MINERAL SOLUBILITY FROM RATE DATA: APPLICATION TO THE DISSOLUTION OF MAGNESIAN CALCITES,
State Univ. of New York, Buffalo. Dept. of Geological Sciences.
L. N. Plummer, and F. T. MacKenzie.
American Journal of Science, Vol 274, No 1, p 61-83, January, 1974. 13 fig, 3 tab, 45 ref. NSF (GA-32120).

Descriptors: *Solubility, *Magnesium, *Graphical analysis, *Mineralogy, Dissolved solids, Sedimentation, Equilibrium, Stability.

The procedure of extrapolating some quantity, measured during dissolution, to infinite time on 1/sq root of time plots to predict mineral solubility has been investigated for the dissolution of Iceland spar at 25C and 0.97 atm CO2 and used to predict magnesian calcite stability. The advantages of predicting mineral solubility from rate data are that (1) the data can be obtained from low temperature-low pressure experiments (where ionic activity coefficients and ionic equilibria are least known), and (2) the reaction does not necessarily have to reach equilibrium. The above procedure was used to determine the stability of magnesian calcite between 0 and 27 mole percent MgCO3 from the dissolution characteristics of biogenic skeletal material. The rate studies of magnesium calcites suggest that the stabilization of Mg-calcite skeletal grains in carbonate sediments proceeds in a stepwise manner which accounts for the excellent preservation of Mg-calcite skeletal frameworks in acient rocks. (Jernigan-Vanderbilt)
W75-02091

ANALYSIS FOR CHROMIUM TRACES IN NATURAL WATERS-PART I. PRECONCENTRATION OF CHROMATE FROM P.P.B. LEVELS IN AQUEOUS SOLUTIONS BY ION EXCHANGE,
California Inst. of Tech., Pasadena. Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 5A.
W75-02101

ACCURATE DETERMINATION OF COPPER IN MIXTURES AND ORES BY RADIOISOTOPE-EXCITED X-RAY FLUORESCENCE SPECTROMETRIC ANALYSIS USING PEAK RATIOS,
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Centre.
C. Shenberg, A. B. Haim, and S. Amiel.
Analytical Chemistry, Vol 45, No 11, p 1804-1808, September, 1973. 6 fig, 4 tab, 6 ref.

Descriptors: *Copper, *X-ray fluorescence, *X-ray spectroscopy, Iron, Radioisotopes, Analytical techniques, Instrumentation, Correlation analysis, *Pollutant identification.

In a solution containing a single predominant element, the ratio of an X-ray fluorescent line to a target backscattered line varies linearly with the concentration of the element over a wide range. However, the presence of an additional component of lower Z distorts the proportionality. This work shows that accurate analysis can be carried out in mixtures by suitable treatment of the data. A rough estimate of the lower Z component was obtained by the usual peak ratio method. The ratio of its fluorescent line to the target backscattered line was largely independent of the concentration of the higher Z component. This fact and a comparison of mixture solutions of various concentrations with single-element solutions of similar concentrations permitted correction for the distortion introduced by the presence of the lower Z element. The case studied was the mutual influence of Cu and Fe on the ratios between the fluorescent K X-rays of the individual elements and the backscattered target X-rays in various Cu-Fe mixtures. The X-rays were excited using an Am241-As source-target assembly and measured with a Si(Li) detector. Using the new method of calculation, satisfactory analytical results were obtained for solutions of 0.6 to 25 w/v % Cu in the presence of 0.4 to 23w/v % Fe. The procedure was extended to solid mixtures and ores containing up to 80% Cu. (Rowe-Vanderbilt)
W75-02113

STUDY OF THE APPLICATION OF ATOMIC FLUORESCENCE SPECTROMETRY TO THE DIRECT DETERMINATION OF MERCURY AND CADMIUM IN THE ATMOSPHERE,
Louisiana State Univ., Baton Rouge. Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W75-02196

2L. Estuaries

MIXING OF MERGING BUOYANT JETS FROM A MANIFOLD IN STAGNANT RECEIVING WATER OF UNIFORM DENSITY,
For primary bibliographic entry see Field 5B.
W75-01690

THE NORTH SEA CONTINENTAL SHELF CASES: A POSTSCRIPT,
Syracuse Univ., N.Y. Coll. of Law.
For primary bibliographic entry see Field 6E.
W75-01717

COASTAL ZONE MANAGEMENT PROGRAM DEVELOPMENT GRANTS--PROPOSED RULES.
National Oceanic and Atmospheric Administration, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01728

THE LEGAL CONTROL OF THE SEA, PREPARATIONS FOR THE 1973 CONFERENCE,
Oxford Univ. (England).
For primary bibliographic entry see Field 6E.
W75-01782

A CONGRESSIONAL VIEWPOINT OF COASTAL AND MARINE-RELATED AFFAIRS,
Committee on Commerce (U.S. Senate). Sub-committee on Oceans and Atmosphere.
For primary bibliographic entry see Field 6E.
W75-01785

STATE AND LOCAL ROLES IN COASTAL AREA PLANNING AND MANAGEMENT,
North Carolina Univ., Chapel Hill. Inst. of Government.
For primary bibliographic entry see Field 6E.
W75-01786

PRIORITIES FOR INDUSTRIAL DEVELOPMENT IN COASTAL AREAS,
North Carolina State Univ., Raleigh. Industrial Extension Service.
L. H. Hammond, J. W. Butler, D. R. Keifer, and G. A. Bramlett.
In: Report of the Governors' Conference on Marine Resources, Charleston, South Carolina, December 17-18, 1973, p 53-67, (1973).

Descriptors: *Industry, *Economic aspects, *Conservation, *Resource development, *Area redevelopment, Land use, Economic impact, Occupations, Employment, City planning, Georgia, South Carolina, North Carolina, Coordination, Adoption of practices, State governments, Federal government, Cost-benefit analysis, Decision-making, Resource allocation, Water requirements, Coasts, Shores, Environmental effects, Estuaries, Aesthetics.
Identifiers: Coastal waters.

Industrial development is the cornerstone to all serious economic growth and development programs. The problems of industrial growth in the coastal areas of North Carolina, South Carolina, and Georgia are examined. Environmental goals must receive priority consideration along with economic development goals. Environmental goals can be achieved more efficiently by clustering industrial development activities in urban centers. The coastal environment is particularly fragile. More systematic economic growth management can take place if there is federal, state and local cooperation. The fragile nature of the immediate shoreline, the sounds, and the estuaries suggests that heavy industrial development should not be scattered up and down the entire coast. Where it is necessary by virtue of water transportation or other factors to have heavy industry on the immediate coast, then it should be concentrated in a relatively tight cluster. In this manner many other uses of the coast will not be destroyed. Caution needs to be exercised to prevent short-range development from causing long-range damage to the environment. (Sperling-Florida)
W75-01787

THE 'DISTANCE PLUS JOINT DEVELOPMENT ZONE' FORMULA: A PROPOSAL FOR THE SPEEDY AND PRACTICAL RESOLUTION OF THE EAST CHINA AND YELLOW SEAS CONTINENTAL SHELF OIL CONTROVERSY,
For primary bibliographic entry see Field 6E.
W75-01791

SAVING THE SEASHORE--MANAGEMENT PLANNING FOR THE COASTAL ZONE,
For primary bibliographic entry see Field 6E.
W75-01792

POWER, PLANKTON, AND FIREFLY TAILS,
National Marine Water Quality Lab., West Kingston, R.I.
For primary bibliographic entry see Field 5B.
W75-01795

CONSERVATION EASEMENTS: THE MAINE COAST EXAMPLE,
Maine Coast Heritage Trust, Bar Harbor.
For primary bibliographic entry see Field 6F.
W75-01797

LIFE AND POLLUTION IN GREAT SOUTH BAY,
Offshore/Sea Development Corp., New York.
For primary bibliographic entry see Field 5B.
W75-01799

GEOLOGIC AND HYDROLOGIC CONTROL OF CHLORIDE CONTAMINATION IN AQUIFERS AT BRUNSWICK, GLYNN COUNTY, GEORGIA,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 5B.
W75-01816

WASTEWATER DISCHARGES INTO PENSACOLA BAY, ESCAMBIA BAY AND RIVER (EXCLUDING MONSANTO, AMERICAN CYANAMID AND AIR PRODUCTS),
Environmental Protection Agency, Athens, Ga. Surveillance and Analysis Div.
For primary bibliographic entry see Field 5B.
W75-01826

MERCURY IN SOME MARINE ORGANISMS FROM THE OSLOFJORD,
Oslo Univ. (Norway). Lab. for Marine Zoology and Marine Chemistry.
For primary bibliographic entry see Field 5C.
W75-01828

PESTICIDE LEVELS IN ESTUARINE AND MARINE FISH AND INVERTEBRATES FROM THE GUATEMALAN PACIFIC COAST,
Peace Corps-FAO Cooperative Central American Fisheries Development Program (Guatemala).
For primary bibliographic entry see Field 5C.
W75-01829

REMOTE-SENSING STUDIES OF HYDROLOGIC ENVIRONMENTS IN THE LOWER RARITAN RIVER SYSTEM, NEW JERSEY,
Geological Survey, Trenton, N.J.
For primary bibliographic entry see Field 5B.
W75-01850

TRACE METAL CONCENTRATIONS IN BROWN SEAWEEDS, CARDIGAN BAY, WALES,
University Coll. of Wales, Aberystwyth. Dept. of Geology.
For primary bibliographic entry see Field 5B.
W75-01876

MULTI-CAPACITY WATER SAMPLER,
For primary bibliographic entry see Field 7B.
W75-01903

TIDAL FLOW IN EXPONENTIALLY VARYING ESTUARIES,
Syracuse Univ., N.Y. Dept. of Civil Engineering.
W-H. Li, and M. E. Kozlowski.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 100, No HY11, Proceedings Paper 10967, p 1649-1676, November 1974. 4 fig, 9 tab, 8 ref, 3 append. NSF Grant GK-33815.

Descriptors: *Estuaries, *Tides, *Analytical techniques, *Flow resistance, Hydraulics, Continuity equation, Mathematical models, Currents(Water), Equations.
Identifiers: Oscillations, Shallow water theory, *Perturbation.

Freshwater flow and diurnal inequality were assumed negligible in obtaining a solution for tidal flow in estuaries with cross sectional area decreasing exponentially with distance. A perturbation technique was used to determine a periodic solution to the governing equations for small amplitude shallow water theory. The flow resistance was based on Manning's equation and was linearized. Tables of functions in the solution were presented. An example was included that compared the results of this technique to a solution obtained by the method of characteristics. (Adams-ISWS)
W75-01996

SEDIMENT TRANSPORT IN TIDAL RIVER,
Calcutta Port Commissioners (India).
A. N. Biswas, and A. K. Chakrabarti.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 100, No HY11, Proceedings Paper 10964, p 1677-1683, November 1974. 1 fig, 4 tab, 10 ref, 2 append.

Descriptors: *Sediment load, *Bed load, *Tidal streams, *Suspended load, Sediment transport, Tides, Rivers, Sedimentation, Hydraulics, Measurement, Estuaries, Hydraulic models, Sediments.
Identifiers: *Modified Einstein method, India(River Hooghly).

A sediment transport computation technique for a tidal river with graded bed material was developed by the application of relationships from the modified Einstein method and by use of the 'frozen flow' assumption at the instant of the calculation. The intensity of shear was evaluated by using a flow model. Results were given for one ebb and two flood observations. Comparison of the computed results with measurements indicated fair agreement in the range of coarser sediments. (Adams-ISWS)
W75-01997

COMPARISON OF RECENT SEAWATER FREEZING POINT DATA,
Rhode Island Univ., Kingston. Graduate School of Oceanography.
For primary bibliographic entry see Field 2C.
W75-01999

SHORELINE DEVELOPMENT: POLICY ISSUES IN NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand).
For primary bibliographic entry see Field 6B.
W75-02168

THE NUMERICAL SOLUTION OF THE STEADY INTERFACE IN A CONFINED COASTAL AQUIFER,
James Cook Univ. of North Queensland, Townsville (Australia).
For primary bibliographic entry see Field 2F.
W75-02182

3. WATER SUPPLY AUGMENTATION AND CONSERVATION

3A. Saline Water Conversion

PRETREATMENT OF SALINE WATER PRIOR TO DESALINATION,
Department of the Interior, Washington, D.C.
For primary bibliographic entry see Field 5D.
W75-01656

Field 3—WATER SUPPLY AUGMENTATION AND CONSERVATION

Group 3A—Saline Water Conversion

MULTIPLE EFFECT EVAPORATOR SYSTEM,
Aerojet-General Corp., El Monte, Calif. (assignee)
K. F. Frank.
U. S. Patent No. 3,830,704, 4 p, 5 fig, 9 ref; Official Gazette of the United States Patent Office, Vol 925, No 3, p 952, August 20, 1974.

Descriptors: *Patents, *Evaporation, *Separation techniques, *Evaporators, *Waste water treatment, Water purification, Water quality control, Water vapor, Equipment, Sea water, Brackish water, Heat transfer, *Desalination.
Identifiers: Vapor flow.

The evaporator and preheater are housed in a common vessel. The feed stream to the evaporator proper is advantageously divided into two fluid paths, each comprising a long tube bundle, which are respectively located in separate preheater compartments along opposite inside walls of the elongated shell in which the unitized system is housed. With this arrangement each of the two preheater feed tube bundles is effectively heated in sequentially located preheater sections of a single preheater compartment by vapors from alternate evaporator effects. By heating each of the preheater tube bundles in succeeding sections with hot vapors from alternate effects, the temperature differential between the vapor and the feed is maximized in each preheater section of both compartments and this makes possible more efficient heat transfer to the feed. (Sinha-OEIS)
W75-02140

APPARATUS FOR MONITORING WATER PURIFICATION SYSTEM,
J. C. Dolan, and N. E. Ball.
U. S. Patent No. 3,838,774, 8 p, 6 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, p 116, October 1, 1974.

Descriptors: *Patents, *Monitoring, Water quality, *Conductivity, *Water quality control, Measurement, *Reverse osmosis, *Desalination processes, Meters, Electrical conductance, Waste water treatment.

An apparatus for precisely monitoring the effectiveness of a reverse osmosis water purification system is disclosed which continuously measures and compares the electrical conductivities of the impure aqueous solution and the purified water on the inlet and outlet sides, respectively, of the semipermeable membrane of the reverse osmosis system. A meter provides a visual indication of the comparison which is preferably related to the ratio of the outlet side conductivity to the inlet side conductivity and a fail-safe alarm signals when this ratio exceeds a selected level. The meter may be scaled so that during a normal operating mode of the apparatus it indicates the actual ratio of the impurity levels of the outlet and inlet sides and during a test mode it indicates a selectable alarm point. (Sinha-OEIS)
W75-02141

MULTIPLE EFFECT EVAPORATOR,
Hitachi Ltd., Tokyo (Japan). (assignee)
K. Izumi.
U.S. Patent No, 3 839,160, 8 p, 11 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, p 230, October 1, 1974.

Descriptors: *Patents, *Evaporation, *Sea water, *Condensation, *Distillation, *Desalination, *Water purification, Freshwater, Thermal properties, Water vapor, Equipment, Desalination apparatus.
Identifiers: Multi-stage flash evaporator.

A multiple effect evaporator for making fresh water from sea water comprises of a multistage flash evaporator which preheates the sea water. The multistage flash evaporator is combined with a multistage fresh water flash evaporator so that pure water can also be made. The evaporation-condensation area is distributed according to the amount of vapor generated at each evaporation stage to enhance the thermal efficiency. The evaporator effects and multistage flash evaporator are arranged in a single casing to eliminate a certain piping and thereby simplify the construction of the evaporator. (Sinha-OEIS)
W75-02143

DISTILLING SEA WATER DIFFUSED THROUGH A MEMBRANE,
Basic Sciences, Inc., Bethel, Conn. (Assignee).
H. W. Scott, and R. A. Eversole.
US Patent No 3,841, 976, 3 p, 6 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 1134, October 15, 1974.

Descriptors: *Patents, *Sea water, *Distillation, *Evaporation, *Desalination, Water quality control, *Separation techniques, *Membranes, Osmosis, Reverse osmosis, Equipment.
Identifiers: Evaporator lens.

This invention seeks to combine the economy of a still with the principals of osmosis, reverse osmosis and diffusion in order to provide a substantially continuous purification system. The osmotic membrane contacts a source of liquid having a lesser concentration of dissolved solids so that the liquid will pass to the concentrated zone furnishing a continuous supply of liquid to replenish that vaporized at the evaporative surface in the evaporation chamber. The still aparatus functions without any additional heat energy other than that obtained from solar or other forms of radiant energy with an evaporator lens. (Sinha-OEIS)
W75-02157

METHOD FOR REMOVING SULFATE AND BICARBONATE IONS FROM SEA WATER OR BRACKISH WATER THROUGH THE USE OF WEAK ANIONIC EXCHANGE RESINS CONTAINING AMINO GROUPS OF THE PRIMARY AND SECONDARY TYPE,
Consiglio Nazionale Delle Ricerche, Rome (Italy), (Assignee).
G. Boari.
US Patent No 3,842,002, 5 p, 4 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 1143, October 15, 1974.

Descriptors: *Patents, *Sea water, *Desalination, *Scale prevention, Chemical reactions, Ion exchange, *Anion exchange, *Separation techniques, Demineralization, Brackish water, Ions, Sulfates, Biocarbonates, Chlorides, Resins.
Identifiers: Chemical treatment.

The invention relates to a method for removing sulfate and bicarbonate ions found in sea water or brackish water, prior to being subjected to desalination. These sulfate and bicarbonate ions, when permitted to come in contact with desalination equipment, tend to foul such equipment and eventually impair its performance. More specifically, the present invention proposes to remove such sulfate and bicarbonate ions from sea water or brackish water, prior to being subjected to desalination, through the use of any weak anionic resin containing amino functional groups of the primary and secondary type and which have been converted to the chloride form, the chloride form of the above-described resin being used alone or in combination with cationic resins. (Sinha-OEIS)
W75-02160

WATER PURIFICATION MEMBRANES AND METHOD OF PREPARATION.
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
For primary bibliographic entry see Field 5D.
W75-02162

3B. Water Yield Improvement

A SUMMARY OF THE U.S. NAVY PROGRAM AND FY 1967 PROGRESS IN WEATHER MODIFICATION AND CONTROL.
Navy Weather Research Facility, Norfolk, Va.
Available from the National Technical Information Service, Springfield, Va 22161, as AD-778 035, $3.25 in paper copy, $2.25 in microfiche. NAVWEARSCHFAC Technical Paper No 14-67. 12 p.

Descriptors: *Weather modification, *Research and development, Projects, Investigations, Programs, *Cloud physics, Model studies, Computer models, Weather, Nucleation, Climatology, *Cloud seeding.

The U.S. Navy program and Fiscal Year 1967 progress in weather modification and control were summarized. Subject areas included cloud physics and nucleation, weather modification by computer modelling, Project Stormfury operations-1967, and flight studies of glaciation in clouds at -4 to -6C. Additional programs that contribute to a supporting technology for weather modification were listed. (Humphreys-ISWS)
W75-01975

A SUMMARY OF THE U.S. NAVY PROGRAM AND FY 1968 PROGRESS IN WEATHER MODIFICATION AND CONTROL.
Navy Weather Research Facility, Norfolk, Va.
Available from the National Technical Information Service, Springfield, Va 22161, as AD-778 322, $3.75 in paper copy, $2.25 in microfiche. NAVWEARSCFAC Technical Paper No 30-68, November 1968. 37 p, 2 fig, 1 tab.

Descriptors: *Weather modification, *Research and development, Projects, *Cloud physics, Investigations, Model studies, Programs, Climatology, *Cloud seeding, Weather, Nucleation, Computer models.

The U.S. Navy program and Fiscal Year 1968 progress in weather modification and control were summarized. Cloud physics studies reported were seeding of continental and maritime type clouds, aircraft rainfall measurement, and composition of cloud nuclei. Weather modification techniques development included highlights of major weather modification field experiments, aircraft instrumentation acquired, and laboratory nucleation studies. Weather modification experiments by computer modeling are being developed for warm-fog dispersion, condensation-coalescence precipitation, ice-phase precipitation, and climatology of the potential of ice-phase modification of convective clouds. Several additional programs that contribute to a supporting technology for weather modification were listed. (Humphreys-ISWS)
W75-01979

A TECHNICAL AND ECONOMIC REVIEW OF WATER HARVESTING METHODS,
Western Australia University, Nedlands (Australia). Dept. of Civil Engineering.
M. Hollick.
Civil Engineering Transactions, The Institution of Engineers Australia, Vol CE16, No 2, p 120-125, 1974. 3 fig, 1 tab, 33 ref.

Descriptors: *Reviews, *Water harvesting, *Water costs, *Agricultural watersheds, Runoff, Rainfall-runoff relationships, Economics, Water yield improvement, Infiltration, Soil surfaces, Compacted soils.
Identifiers: *Roaded catchments.

Currently available materials and methods for modifying the ground surface to increase runoff are reviewed, and a comparative assessment of resultant water costs made. Methods for completely sealing the soil surface such as butyl rubber or

plastic membranes and bitumen are considered to be too expensive for farm use, and chemical treatment of the soil to make it hydrophobic have not proved successful to date. The best solution for many areas seems to be the ground forming concept of the roaded catchment combined with compaction or fuel oil to reduce the infiltration rate. (CSIRO)
W75-02178

3C. Use Of Water Of Impaired Quality

SOIL SALINITY REDUCED BY SUMMER FALLOW AND CROP RESIDUES,
Agricultural Research Service, Mandan, N. Dak.
For primary bibliographic entry see Field 2G.
W75-01688

3D. Conservation In Domestic and Municipal Use

A MODERN METROPOLIS LOOKS AHEAD,
Pitometer Associates, Inc., Chicago, Ill.
For primary bibliographic entry see Field 6B.
W75-01809

FURTHER ANALYSIS OF OPTIMUM SIZE SEAPORT,
Gibb (Alexander) and Partners, London (England).
For primary bibliographic entry see Field 6B.
W75-01810

MANPOWER REQUIREMENTS FOR WASTE WATER COLLECTION SYSTEMS IN CITIES AND TOWNS UP TO 150,000 IN POPULATION.
North Carolina Agricultural and Technical State Univ., Greensboro. Center for Manpower Research and Training.
For primary bibliographic entry see Field 5D.
W75-01840

RECREATIONAL REUSE OF MUNICIPAL WASTEWATER,
Texas Tech Univ., Lubbock. Water Resources Center.
For primary bibliographic entry see Field 5D.
W75-01853

WATER FACILITIES PLANNING ANALYSIS FOR THE CITY OF JACKSON, MISSISSIPPI.
Engineering Associates, Inc., Jackson, Miss.
Available from the National Technical Information Service, Springfield, Va. 22161 as PB-225 405, $4.25 in paper copy, $2.25 in microfiche. Prepared for Jackson City Planning Board, July, 1973. 46 p, 3 fig, 11 tab. CPA-MS-04-25-1003. CPA-MS-04-25-1003.

Descriptors: *Hydraulic systems, *Transmission lines, *Capital costs, *Planning, *Water distribution(Applied), *Water management(Applied), *Water requirements, Hydraulic equipment, Water distribution, Water demand, *Mississippi.
Identifiers: *Jackson(Miss), Improvements, Univac 1106, Area-wide concept.

Hydraulic capabilities and needs of the 140 square mile Jackson Water System are analyzed using UNIVAC 1106 incorporating the key elements of population growth and distribution, domestic water consumption requirements, fire protection requirements and design. Central purpose of the report is 'to determine logical routes and optimum sizes of transmission mains in newly annexed service areas that must be constructed immediately' and to determine the system requirements for the year 1995. Details of corrective action necessary to improve functioning of the present system and needs for specific areas of anticipated population growth are set forth. Recommendations include: (1) annual review of system by computer analysis to monitor completed and scheduled construction of improvements; (2) construction of a 60 in. main to provide additional raw water from reservoir impoundment; (3) study of future source of water for the Jackson System; (4) planning for a new treatment plant should begin about 1980; (5) all 4 in. mains be replaced and 6 in. mains be looped immediately, additional mains be installed as detailed; (6) acquiring necessary easements promptly by city to reduce future costs. The program should result in a long range decrease in capital cost by eliminating duplication of mains plus net savings in the planning and management stage of the system. If Jackson decides to enter into an area-wide concept of water distribution, the program developed for this management study can be readily adopted do the area-wide concept for continuing annual programming of capital improvements. (Diefendorf-North Carolina)
W75-01929

UPDATED WATER AND SEWERAGE PROGRAM.
Greene County Planning Dept., Cairo, N.Y.
For primary bibliographic entry see Field 5D.
W75-01931

WATER QUALITY MANAGEMENT PLAN FOR AIKEN COUNTY, SOUTH CAROLINA, PART I.
South Carolina Administration Div., Columbia. Office of State Planning.
For primary bibliographic entry see Field 5G.
W75-01932

TWO AWT PLANTS FOR FITCHBURG, MASS.,
Camp, Dresser and McKee, Boston, Mass.
For primary bibliographic entry see Field 5D.
W75-01939

WATER POLLUTION PROBLEMS IN THE REPUBLIC OF SINGAPORE,
Mander, Raikes and Marshall, Bristol (England).
For primary bibliographic entry see Field 5G.
W75-01941

MAKE WATER POLLUTION CONTROL A MEANINGFUL LOCAL RESPONSIBILITY,
Muncie Sanitary District, Ind. Water Quality Div.
For primary bibliographic entry see Field 5G.
W75-01948

WATER PLANNING IN A NO-GROWTH COUNTY,
Kennedy Engineers, Inc., San Francisco, Calif.
For primary bibliographic entry see Field 6B.
W75-01949

UNDERGROUND RESERVOIR MAKES ROOM FOR PARK ABOVE,
Sacramento Div. of Water and Sewers, Calif.
For primary bibliographic entry see Field 4A.
W75-01951

THE AMERICAN CITY'S POSITION ON URBAN WATER SUPPLY.
For primary bibliographic entry see Field 5F.
W75-01952

DESIGN GUIDELINES FOR DISTRIBUTION SYSTEMS AS DEVELOPED AND USED BY AN INVESTOR-OWNED UTILITY,
California Water Service Co., San Jose.
For primary bibliographic entry see Field 6D.
W75-01954

URBAN STORMWATER DRAINAGE PLANNING AND ENVIRONMENTAL DESIGN,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
For primary bibliographic entry see Field 4A.
W75-02170

RECENT EXPANSION OF PERTH'S SEWERAGE SYSTEM,
Perth Metropolitan Water Supply, Sewerage and Drainage Board, Perth (Australia). Sewerage and Drainage Branch.
For primary bibliographic entry see Field 5D.
W75-02177

THE IMPACT OF URBAN WATER USE ON THE RURAL COMMUNITY,
Gutteridge, Haskins and Davey Pty Ltd., Brisbane (Australia).
For primary bibliographic entry see Field 6D.
W75-02188

3E. Conservation In Industry

PRIORITIES FOR INDUSTRIAL DEVELOPMENT IN COASTAL AREAS,
North Carolina State Univ., Raleigh. Industrial Extension Service.
For primary bibliographic entry see Field 2L.
W75-01787

THE 'DISTANCE PLUS JOINT DEVELOPMENT ZONE' FORMULA: A PROPOSAL FOR THE SPEEDY AND PRACTICAL RESOLUTION OF THE EAST CHINA AND YELLOW SEAS CONTINENTAL SHELF OIL CONTROVERSY,
For primary bibliographic entry see Field 6E.
W75-01791

BASIC CONSIDERATIONS OF THE CLOSED MILL SYSTEM,
Technische Universitaet, Darmstadt (West Germany). Institut fuer Paperfabrikation.
W. Brecht, and H-L. Dalpke.
Paper (London), Vol 181, No 8, p 413, 415-416, 421, April 17, 1974. 1 fig, 14 ref.

Descriptors: *Pulp wastes, *Water conservation, Freshwater, *Closed conduits, *Industrial water, Waste treatment, *Waste water treatment, Pulp and paper industry, Economics, Temperature, Fibers(Plant), Slime, Water consumption(Except consumptive use), Operation and maintenance, *Water reuse.
Identifiers: White water(Paper machine).

In view of stricter environmental protection legislation, the closure or partial closure of paper mill water circulation systems has become both urgent and economically promising. Advantages of a closed white water system are contrasted with the arising manufacturing problems posed by resulting higher operating temperatures and fiber consistencies and dangers of slime and other deposits. Principles of freshwater conservation and the state of the art of water circuit closure are reviewed. (Witt-IPC)
W75-02015

SCLAIRPIPE REPLACES OLD WATER LINE FAST.
Pulp and Paper Canada, Vol 75, No 9, p 49-50, Sept 1974. 3 fig.

Descriptors: *Pipelines, *Aqueducts, *Water supply, *Plastics, Freshwater, *Industrial water, *Pulp and paper industry, *Canada, Hydraulic structures, Engineering structures.
Identifiers: Polyethylene, Sclairpipe.

Quebec North Shore Paper Co. replaced the wood-stave section of its freshwater supply line at Baie Comeau by DuPont's 'Sclairpipe' made of polyethylene. The new piping is relatively inexpensive and simple to install, is not subject to rot or decay, and is virtually leakproof, since it is joined by fusion. (Sykes-IPC)
W75-02019

CONTROL OF DEPOSIT FORMATION AND RELATED PROBLEMS IN THE BLEACH PLANT AND PULP MILL.
Betz Labs., Inc., Trerose, Pa.
In: Preprinted Proceedings TAPPI Alkaline Pulping Conference, Seattle, Washington, Sept. 16-18, 1974, (TAPPI, Atlanta, Ga.), p 59-66, (1974). 2 fig, 9 ref.

Descriptors: *Water purification, Water treatment, *Water conservation, *Recirculated water, *Water reuse, Closed conduits, Industrial water, Pulp and paper industry, Additives, *Scaling, *Corrosion, Calcium carbonate, Slime, Organic compounds, Inorganic compounds, Lipids, Organic acids, Operation and maintenance, Foaming, Surfactants, Adsorption, Polymers.
Identifiers: Pitch, Bleach plants, Paper machines, Paper mills, Pulp mills, Kraft mills, Kraft pulp, Brown stock, Pulp washing.

Increased water reuse by closure of the white-water system in paper mills has been encouraged both by productivity and ecological considerations, but has also aggravated problems of deposit formation in bleach plants and pulp mills. Two basic types of deposits are inorganic calcium carbonate scales and organic pitch which comprises abietic acids, saturated and unsaturated fatty carboxylic acids, esters, and unsaponifiable compounds derived from natural materials and from screen room defoamers. Control of these deposits is feasible through a multistage water treatment program. Four case histories involving the use of chemical additives are presented to illustrate different possible approaches, viz., polymer additions to the white liquor clarifier and/or the calcium hypochlorite clarifier; adsorbent additions to the bleach plant and/or the paper machine; surfactant addition to the first alkaline extraction stage; and/or addition of surfactant plus adsorbent to the brown stock (unbleached kraft pulp) washer. (Brown-IPC)
W75-02035

NSSC MILL EXPERIENCE WITH WASTE WATER REUSE AND REVERSE OSMOSIS,
Green Bay Packaging Inc., Wis.
For primary bibliographic entry see Field 5D.
W75-02037

GLATFELTER SOLVED PROBLEM OF A HOPELESSLY POLLUTED MAIN STREAM.
For primary bibliographic entry see Field 5D.
W75-02042

POLLUTION, PAPER INDUSTRY, AND RECYCLING--A PERSPECTIVE FOR THIS DECADE (LA CONTAMINACION, LA INDUSTRIA DEL PAPEL Y EL RECICLAJE, UNA PERSPECTIVA PARA ESTA DECADA),
For primary bibliographic entry see Field 5D.
W75-02045

SOLVENT EXTRACTION OF METALS FROM AMMONIACAL SOLUTIONS,
Power-Gas Ltd., Stockton-on-Tees (England).
For primary bibliographic entry see Field 5D.
W75-02077

3F. Conservation In Agriculture

DROUGHT EFFECTS ON THE GROWTH AND YIELD OF GRAIN SORGHUM, (IN FRENCH),
Institut National de la Recherche Agronomique, Toulouse (France). Station d'Agronomie.
A. Langlet.
Ann Agron (Paris). Vol 24, No 3, p 307-338, 1973, Illus. English summary.

Descriptors: *Sorghum, Field crops, Crops, Irrigation, *Irrigation practices, *Drought tolerance, *Crop response, Crop production.
Identifiers: Transpiration ratio.

The behavior of grain sorghum in relation to deficient water supply was investigated in pot experiments under shelter. The scope of such deficiencies, defined as the ratio of transpiration for the processed plants to the transpiration of the control plants, remains the same throughout. Sorghum underwent these deficiencies at various stages of growth in order to find which affected the yield most and, to thereby determine the more suitable irrigation periods. Notwithstanding a substantial compensation potential through ramification of the main stems, the more sensitive period is that extending from grain swelling initially to becoming doughly. Drought either curtails the number of spikelets, or the 1000 grain weight. Earlier droughts are also damaging if in the region of 20 days. Sorghum may stagger bloom-time differentiation which might, under certain conditions, promote drought resistance.--Copyright 1974, Biological Abstracts, Inc.
W75-01681

CHANGES IN THE MYCOFLORAS OF PASTURE SOILS AFTER LONG-TERM IRRIGATION,
Department of Scientific and Industrial Research, Wellington (New Zealand). Information Services.
Q. W. Ruscoe.
N Z J Sci. Vol 16, No 1, p 9-20, 1973.

Descriptors: *Pastures, Soils, Irrigation, *Irrigation practices, Fungi, *Soil fungi.
Identifiers: Absidia spinosa, Trichoderma koningi, Verticillium candelabrum, *New Zealand, Mycofloras.

Mycofloras of pasture soils in New Zealand which had been in an irrigation trial for 22 yr were examined. The irrigation treatments (summer) were: irrigation applied when soil moisture decreased to 20%, applied when soil moisture decreased to 10%, and non-irrigation. A soil-washing technique was used to isolate vegetatively active fungi from soil samples. Isolations were made from discrete soil particles, individual mineral and organic particles, and root fragments. Substrate preference was shown by certain species. Soil fungal patterns are compared with those obtained in previous studies on other pasture soil mycofloras in New Zealand. Long-term irrigation appeared to have produced distinct permanent changes in the topsoil mycofloras. The most obvious were the considerable decrease in frequency of occurrence of Absidia spinosa and the concomitant increase in frequencies of occurrence of Trichoderma koningi and Verticillium candelabrum.--Copyright 1974, Biological Abstracts, Inc.
W75-01689

SELECTION OF AN OPTIMAL IRRIGATION DESIGN, (IN RUSSIAN),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
V. A. Platonov.
Dokl Vses (Ordena Lenina) Akad S-Kh Im V I Lenina. 12 p 30-31, 1973. Illus.
Identifiers: *Algorithms, Environment, *Irrigation, *Optimal design, Plant communities.

The plant community, its environment, preventive measures and algorithm making decisions on the conduction of irrigation are regarded as a single system. The optimal irrigation regime is formulated in a general form as a mathematical programming problem. The effectiveness of optimal strategies is exemplified by a numerical example. The algorithms are used to determine rational irrigation designs for specific conditions, which are in turn determined by the farming conditions, equipment used, biological characteristics of the crop, etc.--Copyright 1974, Biological Abstracts, Inc.
W75-01694

BEHAVIOUR OF DIFFERENT LENGTHS OF IRRIGATION FURROWS UNDER VARIABLE LAND SLOPES AND RATES OF DISCHARGES OF IRRIGATION WATER,
Indian Inst. of Tech., Kharagpur. Dept. of Agricultural Engineering.
D. B. Rane, and S. S. Vanjari.
Punjabrao Krishi Vidyapeeth Res J. Vol 2, No 1, p 9-12, 1973. Illus.
Identifiers: *Infiltration, *Irrigation furrows, Rates, Slopes, *Irrigation water, *Land treatment, *Crop response.

The uniformity of water application is related to the infiltration rate of the soil, advance rate of the water front and the recession rate of the water tail. The best combinations of stream sizes, slopes and lengths of furrows were determined. The method of finding out the intake opportunity time during irrigation run has been explained. The relationship between total water application time and total time of advance and secondly the relation of infiltration rate in gal/min/30 m furrow length with the actual rates of discharges used was studied. The method provides a precedure for evaluating the existing irrigation system and for determining the optimum size of stream and period of irrigation.--Copyright 1974, Biological Abstracts, Inc.
W75-01697

BIBLIOGRAPHY ON THE 160-ACRE ANTI-MONOPOLY WATER LAW,
For primary bibliographic entry see Field 6E.
W75-01702

INFLUENCE OF HIGH APPLICATION OF SEMI-LIQUID MANURE AND THE USUAL MINERAL FERTILIZERS ON THE MINERAL CONTENT (NO3, NH4, P AND SO4) OF THE SOIL AND SUBSOIL WATER IN SANDY SOILS OF NORTHWEST GERMANY, (IN GERMAN),
Landwirtschaftskammer Weser-Ems, Oldenburg, W. Ger.
For primary bibliographic entry see Field 2G.
W75-01742

THE DESIGN OF FILTER ADAPTERS FOR IRRIGATION PIPES (O KONSTRUKTSII PRISOYEDINENIYA FIL'TRA K POLIVNOMU TRUBOPROVODU),
For primary bibliographic entry see Field 8A.
W75-01747

EVAPOTRANSPIRATION OF SOME SIMPLE CORN HYBRIDS IN OPTIMUM MOISTURE CONDITIONS OR IN SOIL DROUGHT CONDITIONS, (IN ROMANIAN),
Institutul de Cercetari Pentru Cereale si Plante Tehnice, Fundulea (Rumania).
For primary bibliographic entry see Field 2D.
W75-01775

COMPARISON OF VARIETIES AND HYBRIDS OF ELEPHANT GRASS (PENNISETUM PUR-

PUREUM) IN HYDROMORPHIC SOIL, (IN PORTUGUESE),
Instituto de Pesquisas e Experimentacao Agropecuarias Centro-Oeste, Sete Lagoas (Brazil).
M. M. De Carvalho, O. L. Mozzer, E. S. Emrich, and V. De P. M. Gontijo.
Pesqui Agropecu Bras Ser Zootec, 7, p 39-45, 1972. English summary.

Descriptors: Grasses, *Forages, *Forage grasses, Field crops, *Plant growth.
Identifiers: *Brazil, *Elephant grass, Hybrids, Pennisetum purpureum, Green forage, *Hydromorphic soil.

Twelve varieties and hybrids of Elephant grass were compared on a hydromorphic soil, at Sete Lagoas, Minas Gerais (Brazil). The green forage and dry matter production and the leaf stem ratios for 2 wet periods and 2 dry periods are presented, as well as the average percentage of dry matter and protein in leaves, stems and total plant. During the wet season the best cultivar was 'Mineiro' which yielded 117 tons/ha of green forage containing 21.4 tons of dry matter in the 1st period studied and 180 tons of green forage containing 30 tons of dry matter in the 2nd one. Other cultivars that presented good production in these periods were 'Napier de Goias,' 'Mole de Volta Grande,' 'Costa Rica' and 'Albano, ' the worst ones being 'Porto Rico 534' and 'Porto Rice.' During the dry season the best cultivars were: 'Mineiro,' 'Mole de Volta Grande' and 'Napier de Goias.'--Copyright 1974, Biological Abstracts, Inc.
W75-01804

RIVER INDUS RECHARGE AND REGENERATION,
MacDonald (Murdoch) and Partners, London (England).
For primary bibliographic entry see Field 4B.
W75-01806

THE EFFECTS OF RECREATION POOL SIZE ON IRRIGATION AND POWER GENERATION AT ELEPHANT BUTTE RESERVOIR,
Texas Tech Univ., Lubbock. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W75-01813

ESTIMATION OF DAILY SOIL MOISTURE FOR WINTER WHEAT IN KANSAS,
Kansas State Univ., Manhattan. Dept. of Agronomy.
For primary bibliographic entry see Field 2D.
W75-01855

FUNCTIONAL RELATIONSHIPS AND A COMPUTER PROGRAM FOR STRUCTURAL GULLY CONTROL,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 2J.
W75-01864

POTENTIAL POSSIBILITIES OF IRRIGATED CULTIVATED PASTURES IN THE NORTHWESTERN RUSSIAN SFSR, (IN RUSSIAN),
V. I. Revut, and D. B. Tsipris.
Dokl Vses (Ordena Lenina) Adad S-Kh Im V I Lenina, 12, p 36-37, 1973.
Identifiers: Cultivated pastures, Fertilizers, *Irrigated land, Pastures, Productivity, *USSR(Russian-SFSR), Water requirements(Crops).

The northwestern territory of the Russian SFSR (Soviet Federated Socialist Republic) is a sufficiently wet zone (about 600 mm of precipitation/yr), but in individual vegetative periods precipitation is inadequate for optimal wetting of the soil. The cultivated pastures require 2-3 waterings of 300 cu m/ha in a wet year, 5-6 in an average year, and 8-10 in a dry year. By means of optimal regulation of irrigation and application of fertilizer the potential productivity of the pastures can be realized.--Copyright 1974, Biological Abstracts, Inc.
W75-01905

THE HEAT BALANCE OF ALFALFA AS RELATED TO ITS IRRIGATION WATER REQUIREMENT,
Institute for Atmospheric Physics, Budapest (Hungary).
E. Toth.
Acta Agron Acad Sci Hung, Vol 22, No 3/4, p 405-414, 1973, Illus.
Identifiers: *Alfalfa, Evapotranspiration, *Heat balance, Irrigation, Precipitation(Atmospheric), Soils, Transpiration, *Water requirements(Crops).

The energy used for evapotranspiration averaged 66% of the net radiation. In the 1st 2/3 of the growing season the soil heat flux extracted heat from the active surface, while by Aug. the upward flow of heat replaced the energy losses of the active surface. Water need, actual evapotranspiration, irrigation water requirement and precipitation are given for an 8-yr period. More than 1/2 the irrigation water needed should be applied in July and Aug. Irrigation is usually most effective after cutting.--Copyright 1974, Biological Abstracts, Inc.
W75-01907

ESTIMATING EVAPOTRANSPIRATION USING CANOPY TEMPERATURES: FIELD EVALUATION,
Kansas Agricultural Experiment Station, Manhattan. Evapotranspiration Lab.
For primary bibliographic entry see Field 2D.
W75-01940

FACTORS AFFECTING GROWTH AND RESPONSE OF WHITE CLOVER IN POTS TO APPLIED PHOSPHORUS: I. LEVEL OF WATERING AT WHICH POTS ARE MAINTAINED,
Ruakura Agricultural Research Center, Hamilton (New Zealand).
C. G. Sherrell, and W. M. H. Saunders.
N Z J Agric Res. Vol 17, No 1, p 19-24, 1974, Illus.
Identifiers: *Clover(White), *Fertilizers, *Growth rates, *Phosphorus, *Crop response.

The effect of 3 levels of soil moisture on growth and response of white clover in pots to applied P was studied with soils of low and high P status. On both soils highest yields were obtained at the highest level of moisture, maintained by daily watering until leaching occurred. Maintenance of the pots at a soil moisture level of estimated 'field capacity' resulted in lower yields at all rates of applied P. The differences between yields due to watering treatments were greatest at the nil and low rates of applied P on the soil of high P status, and at the high rates of applied P on the soil of low P status. The leaching method of watering resulted in responses to P in the pots similar to those expected in the field on both soils. It also produced the highest P content in the plants on both soils and prevented the accumulation of soluble salts on the surface of the pots, although not completely on 1 of the soils.--Copyright 1974, Biological Abstracts, Inc.
W75-01947

DATING TERMINATION OF COTTON IRRIGATION FROM SOIL WATER-RETENTION CHARACTERISTICS,
California Univ., Davis. Dept. of Water Science and Engineering.
D. W. Grimes, and W. L. Dickens.
Agron J. Vol 66, No 3, p 403-404. 1974 Illus.
Identifiers: *Cotton, Dating, Gossypium-hirsutum, *Irrigation, Lint, Model studies, Regression analysis, *Soil water retention, Crop yields, *California, San Joaquin Valley(Calif).

In the semiarid San Joaquin Valley of California (USA), about 90% of the evapotranspiration needs for nonstressed cotton (Gossypium hirsutum L.) are met by irrigation. Soil water-retention characteristics determine the frequency with which irrigations must be made to replenish depleted soil water during the growing season. Studies were conducted in the San Joaquin Valley, on 2 soils that have a broad difference in water retention ability, to determine the best irrigation termination date for cotton. A multiple-regression model that included time of irrigation termination and water-retention capacity of soil as independent varibles was used to describe the influence of these variables on cotton production potential (R2=0.71). Prepared from the function was a graphic relation illustrating an irrigation termination time that allows a 98% relative yield on the basis of the amount of available water the soil can retain. An optimum irrigation termination time was 28 days later for the low water-retaining soil of the study than for the high water-retaining soil. Correct timing of a final irrigation saved water and hastened the opening of mature bolls without harm to lint yield or quality.--Copyright 1974, Biological Abstracts, Inc.
W75-01953

CROPLAND ATLAS OF ARIZONA,
Arizona Crop and Livestock Reporting Service, Phoenix, Arizona.
For primary bibliographic entry see Field 7C.
W75-02047

EFFECT OF SEEDING RATE AND HARVEST MANAGEMENT ON YIELD AND STAND PERSISTENCE IN ALFALFA,
Arizona Univ., Tucson.
G. Barney, M. A. Massengale, and A. K. Dobrenz.
Journal of the Arizona Academy of Science, Vol 9, No 2, p 47-50, June, 1974. 2 fig, 2 tab, 11 ref.

Descriptors: *Alfalfa, *Irrigated land, *Planting management, *Crop production, Seeds, Harvesting, Growth stages, Southwest US, Forages.

Alfalfa is the most important forage crop grown under irrigated conditions in the Southwestern U.S. The purpose of this study was to determine the effect of seeding rates on forage production and stand persistence of alfalfa when harvested at different stages of growth. Alfalfa was seeded at eight rates under irrigated field conditions ranging from 1.1 to 143.4 kg/ha. Seeding rates above 17.9 kg/ha significantly lowered yields. Harvesting alfalfa plants at the 25 percent bloom stage resulted in the highest forage yields over a 2 year period. In addition more plants and better stands were maintained at this level. (Mastic-Arizona)
W75-02049

EVALUATING GROWTH POTENTIAL AFTER DROUGHT STRESS,
California Univ., Davis. Dept. of Agronomy and Range Science.
A. Corleto, and H. M. Laude.
Crop Science, Vol 14, No 2, p 224-227, March-April 1974. 2 fig, 2 tab, 8 ref.

Descriptors: *Droughts, *Soil moisture, *Stress, *Plant growth, Growth rates, Drought resistences, Forage grasses, Wilting point, Permanent wilting, Wetting.
Identifiers: Ryegrass.

Appraisals of plant response to environmental stresses such as drought usually include an expression of plant survival or mortality along with some evaluation of visible injury. In many cases, these values are determined a few days after release

from the stress, which may be too soon to discover the potential for growth resumption in the surviving plants. A study of annual ryegrass subjected to varying levels of soil moisture stress showed that differences in response to stress increased with time, with some not apparent until 4 weeks after release from the stress. The observations indicate that measurements and appraisals of plant response following stress may need to be taken over varying time periods dependent upon the species and severity of stress. (Mastic-Arizona)
W75-02050

HERBAGE PRODUCTION AND THE ACCUMULATION OF SOIL NITROGEN UNDER IRRIGATED PASTURES ON THE RIVERINE PLAIN,
Commonwealth Scientific and Industrial Research Organization, Deniliquin (Australia). Riverina Lab.
C. R. Kleining, J. C. Noble, and A. J. Rixon.
Australian Journal of Experimental Agriculture and Animal Husbandry. Vo 14, No 66, p 49-56, February 1974. 1 fig, 6 tab, 23 ref.

Descriptors: *Nitrogen, *Nitrogen cycle, *Nutrient requirements, *Pastures, *Forage grasses, Grasses, Soil gases, Fertilizers, Yield equations, Plant growth, Soil environment, Ammonium compounds, Nitrogen compounds, Ureas, *Australia.

Due to the lack of nitrogen in the soil of southeastern Australia, this study was undertaken to determine nitrogen accumulation in the soil under annual and perennial pastures. Annual pastures consisted of mixtures of subterranean clover (Trifolium subterraneum) with annual ryegrass (Lolium rigidum) and plots of pure ryegrass; perennial pastures were composed of mixtures of white clover (T. repens) with perennial ryegrass (L. perenna) and plots of pure ryegrass. Both pure ryegrass pastures received applied nitrogen. The dry matter yields and rates of accumulation of herbage nitrogen were lower for annual pastures than for perennial ones. No significant increase was found between soil nitrogen accumulation under annual pastures and that under bare ground, while under all the perennial pastures there was an increase over the value for bare ground. Soil under both the annual and the perennial mixed clover-ryegrass pastures accumulated more nitrogen than that under the pure grass pastures. Total herbage nitrogen was closely enough related to the nitrogen accumulating ability of pastures (in the mat and soil) to be used as a measure for it. Relationships were also found between nitrogen accumulation in the top 7.6 cm of soil and yield of clover, total dry matter yield, and nitrogen content of the grass and clover. Nitrogen recovery, advantages of planting annual pastures with regard to water use, and comparisons of dry matter yield with more humid areas are discussed. (Caldwell-Arizona)
W75-02051

CHANGES IN THE STOMATAL RESPONSE CHARACTERISTICS OF GRAIN SORGHUM PRODUCED BY WATER STRESS DURING GROWTH,
Texas A and M Univ., College Station. Dept. of Soil and Crop Sciences.
K. J. McCree.
Crop Science, Vol 14, No 2, p 273-278, March-April 1974. 5 fig, 27 ref.

Descriptors: *Soil moisture, *Stress, *Stomata, *Transpiration, Leaves, Sorghum, Plant physiology, Carbon, Photosynthesis, Temperature, Atmosphere, Growth chambers, Growth rates, Model studies.
Identifiers: Leaf water potential.

Laboratory experiments have shown that it is possible to modify response characteristics of the stomates of sorghum leaves by growing the plants under soil moisture stress in growth chambers. In leaves subjected to five cycles of water stress during growth, the conductance at a given leaf water potential was consistently higher than it was in leaves which had not been stressed. Results showed that it is possible to produce changes which can explain field behavior of the plants. Whether these changes are advantageous to the plant depends on the circumstances. A prestressed plant would assumably accumulate more carbon and use more water under stress than one that had not been prestressed, but if the extra carbon were used to extend the roots to greater depths, the plant might survive longer and accumulate more carbon over a period of drought. The many unknowns make it impossible to estimate the advantages and disadvantages of changes in stomatal response functions. (Mastic-Arizona)
W75-02052

DESERT PLANT CHEMURGY: A CURRENT REVIEW,
Agricultural Research Service, Weslaco, Tex. Foods Crops Utilization Research Lab.
For primary bibliographic entry see Field 2I.
W75-02053

FAMINE FOODS IN THE RAJASTHAN DESERT,
Jodhpur Univ. (India). Dept. of Botany.
M. M. Bhandari.
Economic Botany, Vol 28, No 1, p 73-81, January-March 1974. 10 ref.

Descriptors: *Desert plants, *Droughts, *Drought tolerance, *Foods, *Water shortage, Ecology, Animals populations, Nutrients, Forages, Monsoons.
Identifiers: *Famine, *India(Rajasthan Desert).

The Rajasthan Desert of India falls within a belt of constant droughts and frequent famine. Presented is a list of edible food grains and other wild edibles used by desert people in times of scarcity. Also described are some animal foods available to some nonvegetarian desert natives. Problems associated with some famine foods include deficiencies in nutrients, possible undesirable elements, and poor digestability. Many problems can be corrected by proper preparation and combinations of foods. It is necessary to guard against malnutrition while avoiding undernutrition. Possibilities exist for introducing useful plants from other desert areas of the world through an understanding of the ecology, physiology, and drought resistance capacity of such plants. (Mastic-Arizona)
W75-02054

VISUAL ASSESSMENT OF TOTAL PLANT RELATIVE WATER CONTENT, WITH THE AID OF PHOTOGRAPHIC STANDARDS AS A GUIDE TO SCHEDULING IRRIGATION,
Western Australian Dept. of Agriculture, Bunbury. District Office.
G. J. Luke.
Australian Journal of Experimental Agriculture and Animal Husbandry, Vol 14, No 66, p 76-79, February 1974. 1 fig, 3 tab, 8 ref.

Descriptors: *Moisture stress, *Photography, *Irrigation practices, Water demand, Water requirements, Water balance, Corn sorghum.
Identifiers: *Relative water content, *Photographic standards.

The practice of using the top leaf only for photographic standards in determining a plant's relative water content (RWC) is questioned. The top and bottom leaves of Zea mays were evaluated for RWC and compared. Under water stress conditions, the top leaf had a higher RWC than the lower leaf. Photographic standards of the plant were taken and, based on the RWC of the entire plant, compared to plants in the field. These standards were shown to portray accurately the plant's water needs only if RWC's from the entire plant were used; using the top leaf only would result in plants not being watered enough, thereby restricting photosynthesis. (Caldwell-Arizona)
W75-02055

UTILITY OF A SIMPLE SOIL WATER BUDGET MODEL IN AGRONOMIC RESEARCH. 2. ESTIMATES OF AVAILABLE SOIL WATER IN RELATION TO PROFILE CHANGES OF SOIL WATER CONTENT AND POTENTIAL,
Sydney Univ., Narrabri (Australia). North West Wheat Research Inst.
For primary bibliographic entry see Field 2G.
W75-02056

THE EFFECT OF RAINFALL, SOIL MOISTURE AND HARVESTING INTENSITY ON GRASS PRODUCTION ON TWO RANGELAND SITES IN KENYA,
Food and Agriculture Organization of the United Nations, Nairobi (Kenya). FAO Range Management Div.
J. T. Cassady.
East African Agricultural and Forestry Journal, Vol 39, No 1, p 26-36, July 1973. 1 tab, 11 ref.

Descriptors: *Range grasses, *Semi-arid climates, *Plant growth, *Range management, *Crop production, Ranges, Soil moisture, Rainfall, Harvesting, Land use, Regime.
Identifiers: *Kenya.

Selected rangeland sites in semi-arid zones in Kenya were studied for the purpose of determining the most productive form of land use to attain effective agricultural development. Indigenous perennial grasses were studied because they provide most of the diet of domestic and wild herbivores that graze the rangelands. Grass was harvested from one to eight times a year to estimate standing crops and accumulated yields under several harvesting intensities. Temperatures were always high enough for plant growth. Rainfall and soil moisture determined plant growth to a large degree. Near maximum yields from long rains were reached within 50 to 100 days even though abundant soil moisture lasted 80 to 200 days. Cutting all grass twice a year during each dry season produced highest yields, even when continued on the same plots for three years. (Mastic-Arizona)
W75-02057

THE DUST CAME AT NOON,
For primary bibliographic entry see Field 4D.
W75-02058

WIND, WATER AND WHEELS,
For primary bibliographic entry see Field 8C.
W75-02059

LOCALIZATION OF LEAD ACCUMULATED BY CORN PLANTS,
Illinois Univ., Urbana. Dept. of Agronomy.
For primary bibliographic entry see Field 5B.
W75-02100

IRRIGATION APPARATUS,
Lockwood Corp., Gering, Nebr. (assignee).
R. Olson.
U. S. Patent No 3,840,043, 4 p, 4 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 501, October 8, 1974.

Descriptors: *Patents, Irrigation, Distribution systems, *Sprinkler irrigation, *Irrigation systems, Equipment, Control systems.

A control system is described which controls a self-propelled sprinkling system for large areas having a central source of water supply. The apparatus consists of a pivot tower, a feed pipe

mounted on the tower, an elongate distribution pipe extending radially outward from the feed pipe, several connections which drive the distribution pipe about the pivot tower, and a control panel. The mounting of the master control panel on the distribution pipe minimizes the number of electrical conductors which must be passed through the pivot tower to provide a system which is more economical and reliable. (Sinha-OEIS)
W75-02150

IRRIGATING PROCESS AND APPARATUSES THEREFOR,
M. H. Wagner.
US Patent No 3,840,180, 13 p, 22 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 548, October 1974.

Descriptors: *Patents, *Water conveyance, *Irrigation, *Sprinkler irrigation, Irrigation design, Equipment, Water distribution(Applied), Conduits.
Identifiers: Airborne conduits.

The process uses the ground effect of a rotating helicopter type rotor to maintain each of a series of conduit-supporting station frames attached to the conduit at spaced apart distances along that conduit at a substantially fixed height over flat or irregular ground and crops while means sensitive to the alignment of each of the series of stations in the horizontal plane provide for moving each of the airborne stations at a uniform angular speed transversely of the conduit in a generally horizontal plane while supplying water to and sprinkling water from the conduit to the ground therebelow at a uniform rate of water volume per unit of ground area. (Sinha-OEIS)
W75-02153

SHORT TERM EFFECT OF SOME METHODS FOR IMPROVING SOIL STRUCTURE IN RED-BROWN EARTH SOILS OF THE NORTHERN IRRIGATION AREAS, VICTORIA (AUSTRALIA).
Victorian Dept. of Agriculture (Australia). Irrigation Research Station.
Australian Journal of Experimental Agriculture and Animal Husbandry, Vol 14, No 70, p 689-693, October 1974. 5 tab, 13 ref.

Descriptors: *Irrigated land, *Pastures, *Soil amendments, *Deep tillage, *Soil physical properties, Soil types, Soil structure, Soil aggregates, Infiltration rates, Hydraulic conductivity, Gypsum, Cultivation, Alfalfa, Subsoil, *Australia.
Identifiers: *Goulburn Valley(Vic).

Soil physical properties--particularly the presence of a compacted clay subsoil--limit pasture production and the carrying capacity of many irrigated farms in the Goulburn Valley of Victoria. An experiment involving three cultivation treatments and four combinations of pasture species and chemical applications has demonstrated that deep ripping, adding gypsum or organic matter, and the use of deep-rooted pasture species had some effect in improving the structure of a typical soil profile of the area. Measures of plant performance and soil properties (including infiltration characteristics and hydraulic conductivity) showed that the effects of the mechanical treatments and the biological and chemical treatments were independent of one another. The greatest effect was from the addition of gypsum which changed the balance of the exchangeable cations and substantially increased the aggregation of the soil. (CSIRO)
W75-02165

4. WATER QUANTITY MANAGEMENT AND CONTROL

4A. Control Of Water On The Surface

BIBLIOGRAPHY ON THE 160-ACRE ANTI-MONOPOLY WATER LAW,
For primary bibliographic entry see Field 6E.
W75-01702

A SOUND WATER PLAN FOR SOUTH FLORIDA: IMPLEMENTATION OF THE 1972 WATER RESOURCES ACT,
Spessard L. Holland Law Center, Gainesville, Fla.
For primary bibliographic entry see Field 6E.
W75-01706

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA.
California State Water Resources Control Board, Sacramento.
For primary bibliographic entry see Field 6E.
W75-01708

PLAIN TALK ABOUT FLOOD PLAINS,
Minnesota Dept. of Natural Resources, St. Paul. Div. of Waters, Soils and Minerals.
For primary bibliographic entry see Field 6F.
W75-01720

GENERAL POLICIES--PROPOSED RULES AND REGULATIONS.
Susquehana River Basin Commission, Harrisburg, Pa.
For primary bibliographic entry see Field 6E.
W75-01734

NEWLANDS RECLAMATION PROJECT, NEVADA--OPERATING CRITERIA AND PROCEDURES.
Department of the Interior, Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01735

WATER RELATED LAND USE PLANNING GUIDELINES,
Interstate Commission on the Potomac River Basin, Bethesda, Md.
W. E. Bullard.
March 1974. 32 p, 5 fig, 4 ref, append.

Descriptors: *Planning, *Comprehensive planning, *Future planning(Projected), *Methodology, *Water resources planning, City planning, Non-structural alternatives, Projections, Scheduling, Administration, Legislation, Management, Resources development, Mapping, Topographical mapping, Urban mapping, Data collection, Decision making, Regulation, Land use, Wetlands, Zoning, Land, Tidal marshes.

Before land use proposals are made, basic background information and projections concerning the area must be studied. Flood plain lands, although economically conducive to commercial and industrial development, may suffer recurrent floods which severely damage permanent structures; growth rate must be considered so that planning assures an adequate water supply for future populations. Final legislation should be passed after public hearings regarding policy determinations and should establish a planning agency charged with preparing and maintaining a long range use and development plan which regulates use of land, wetlands, tidal lands and bodies of water. The plan should include an overlay map and should establish schedules, priorities, and final levels of development for each aspect of the plan. The planning agencies' responsibilities encompass the following: collecting basic data including definitions and delineation of water areas; establishing planning units; identifying present and future needs including variable seasonal water demands for irrigation, transportation, domestic uses, stockwatering, etc.; describing variable and constant physical characteristics such as water pollution and water temperature; and estimating future needs. (Hunter-Florida)
W75-01789

INTERREGIONAL PLANNING OF WATER RESOURCES ALLOCATIONS BY SYSTEMS ANALYSIS APPROACH,
Utah Water Research Lab., Logan.
J. E. Keith, J. C. Andersen, A. B. King, M. H. Anderson, and T. C. Anderson.
A Summary Report to US Army Engineer Institute for Water Resources Fort Belvoir, Va, IWR Contract Report 74-7, July 1974. 91 p, 14 fig, 14 tab, 65 ref, 1 append. DACW31-71-C-0063.

Descriptors: *Water supply development, *Utah, *Water allocation(Policy), *Water demand, *Water delivery, *Water utilization, *Economic efficiency, Linear programming, Optimization, Planning, Costs, Constraints, Methodology, Marginal costs, Systems analysis, Mathematical models, *Regional analysis.

Water allocation in Utah involves considering (1) the allocation of water itself and (2) the allocation of water-related resources necessary to distribute the water; both of these require relatively large investments of public funds. The availability of and demand for water were studied using a systems approach. A supply and demand model was used to determine efficient (optimal) allocations; since the problem is highly complex, mathematical programming techniques using computer technology were utilized, enabling the generation of optimum values for the variables as well as shadow prices which represent marginal cost or value of those variables. The general objective was to develop a methodology for determining optimal allocations of water in Utah, given alternative assumptions and constraints. The approach was to structure a statewide model of water use and delivery in a linear programming framework, explicitly including the water supply system, various water demands, and alternative water salvage, reuse, and transfers under consideration by water planners. Optimal solutions to the statewide programming were based upon maximizing net economic returns to water use in the state, given the alternative assumptions, and were therefore the economically efficient allocations of Utah's water supplies. Given the determination of the efficient allocations over the projected time frame, the economic costs of prematurely investing in transfer facilities or of limiting the use of low-cost water sources were estimated using losses in producers' and consumers' surplus. (Bell-Cornell)
W75-01801

A RISK MODEL ANALYSIS FOR THE STATE WATER PROJECT,
California Univ., Berkeley. Operations Research Center.
For primary bibliographic entry see Field 6A.
W75-01802

APPROACHES FOR DEVELOPING ALTERNATIVES IN PLANNING,
Hydrologic Engineering Center, Davis, Calif.
For primary bibliographic entry see Field 6B.
W75-01805

MEETING REGIONAL WATER REQUIREMENTS--A CASE STUDY,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 6A.
W75-01807

A MODERN METROPOLIS LOOKS AHEAD,
Pitometer Associates, Inc., Chicago, Ill.
For primary bibliographic entry see Field 6B.
W75-01809

OPTIMAL DEVELOPMENT OF MULTIPURPOSE HYDRO PROJECTS,
Department of Water and Power, Los Angeles, Calif. System Development Div.
P. R. Hoffman.
Journal of the Power Division, Proceeding of American Society of Civil Engineers, Vol 100, No P01, Paper No 10655, p 43-52, July 1974. 6 fig.

Descriptors: *Hydroelectric power, *Project feasibility, *Multiple-purpose projects, *Economic impact, *Optimum development plans, Environmental effects, Powerplants, Size, Costs, Water distribution(Applied), Benefits, Pumped storage, Lakes, Recreation, Computers, Estimating, *California.
Identifiers: *Hydro projects, Energy recovery, *Castaic Power Project (Calif).

Recent environmental, legal, and economic developments have had large-scale effects on the optimal development of multipurpose and multiagency hydroelectric projects. The Environmental Protection Act has created many complications. For mixed agency (public and private) developments, there are broad effects resulting from recent court decisions under the Sherman Anti-Trust Act. The economic impact of fuel shortages and costs result in a necessity for reevaluation of hydroelectric projects. The effects of these changes on proposed hydroelectric power redevelopments and energy recovery projects are examined. 'Energy recovery' projects refers to the conversion of hydraulic 'head breaking' plants to power plants. On large-scale distribution systems such a development can save the equivalent of many hundreds of barrels of oil per day. The basic problems unique to this type of development are examined. A unique feature of the cooperative development contract for the Castaic Power Project (Cal.), future redistribution of project benefits by computer, is studied. A practical example of optimal development of a power drop currently being considered for base load utilization is analyzed. (Bell-Cornell)
W75-01811

THE EFFECTS OF RECREATION POOL SIZE ON IRRIGATION AND POWER GENERATION AT ELEPHANT BUTTE RESERVOIR,
Texas Tech Univ., Lubbock. Dept. of Civil Engineering.
B. J. Claborn, B. C. Cook, and C. Carter.
Technical Report WRC-74-1, Water Resources Center, Texas Tech University, Lubbock, Texas, July 1974. 103 p, 23 fig, 12 tab, 26 ref.

Descriptors: Water resources, *Simulation analysis, *Flood control, *Irrigation, *River basins, Projects, *Recreation, Methodology, *Reservoir operation, Evaluation, Benefits, Economics, Synthetic hydrology, Hydrologic data, Powerplants, Computer programs, Decision making, Planning, Statistical methods, Digital computers, Crops, Mathematical models, Systems analysis, Equations, *New Mexico, Texas, Dams, Flow, Rio Grande River.
Identifiers: *Power generation, *Elephant Butte Reservoir(N. Mex), Reservoir elevations, Historic inflows, *Caballo Reservoir(N. Mex).

Citizens and recreationists concerned about water shortage are opting for a permanent recreational pool in Elephant Butte Reservoir, part of the Rio Grande hydrologic system. This study furnishes methodology and data pertinent to the decision making necessary before reaching a final agreement. A model is developed which simulates the regulatory process of the system of reservoirs and power plant, using the physical characteristics of each facility and the operational procedures of the U.S. Bureau of Reclamation. The simulation technique can measure the system's output under long hydrologic sequences, either from the synthetic hydrology generator or from actual historic record. The hydrological inputs produce outputs of power and irrigation releases and flood management data. This output is then evaluated for direct economic benefits. The procedure for collecting and coding the hydrologic data is discussed. Mathematical and statistical theories required for the development of the synthetic hydrology generator are presented; included are: univariate statistics; common probability density functions; least squares, multiple linear, and polynomial regression; Monte Carlo method; and principal component analysis. Described are the steps and logic of the simulation model, including the criteria of the flood routine and the use and logic of the auxiliary functions and subroutines. Future research would be beneficial for the southern New Mexico-El Paso region. Recommended is a re-examination of the entire project, perhaps calling for changes in the legal as well as operational structure of the system. (Bell-Cornell)
W75-01813

FLOOD PROFILES AND INUNDATED AREAS ALONG THE SKOKOMISH RIVER, WASHINGTON.
Geological Survey, Tacoma, Wash.
For primary bibliographic entry see Field 2E.
W75-01815

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, SOUTHEASTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01820

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, CENTRAL REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01821

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30 1971, WESTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01822

PROJECT EVALUATION OF 'INVESTIGATION AND ANALYSIS OF FLOODS FROM SMALL DRAINAGE AREAS IN NEW MEXICO' --A PROGRESS REPORT,
Geological Survey, Albuquerque, N. Mex.
For primary bibliographic entry see Field 2E.
W75-01823

DETERMINATION OF CHANNEL CAPACITY OF THE SAN JOAQUIN RIVER DOWNSTREAM FROM THE MERCED RIVER, MERCED, STANISLAUS, AND SAN JOAQUIN COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
R. G. Simpson, and J. C. Blodgett.
Open-file report, January 7, 1974. 97 p, 3 fig, 4 tab, 6 ref, 15 append.

Descriptors: *Design flow, *Design flood, *California, Discharge(Water), Open channel flow, Stage discharge relations, Backwater.
Identifiers: *San Joaquin River(Calif), Merced River.

The adequacy of a 53.1-mile reach of the San Joaquin River in Merced, Stanislaus, and San Joaquin Counties to carry floodflows was evaluated. The reach studied extends downstream from the mouth of the Merced River to the Banta-Carbona Canal intake. Discharges analyzed range from 20,000 to 60,000 cfs in the reach between cross sections 1 (Banta-Carbona Canal intake) and 32 (mouth of Stanislaus River), and from 20,000 to 50,000 cfs in the reach between sections 32 and 126 (mouth of Merced River). Computed water-surface profiles are based on channel conditions surveyed in 1970 and are contingent on there being no levee failures during peroids of high flow. Flows of 55,000 cfs or less will pass through all bridge openings. Mean velocities for flows of 30,000 to 50,000 cfs, with minimum measured backwater conditions, generally are greatest at bridge crossings where velocities range between 3 and 5 feet per sec. Water-surface elevations for design flows established by the U.S. Army Corps of Engineers, with minimum measured backwater conditions, are generally 2 to 5 ft below the top of existing levees. Profiles for design discharges and the January, February, and June 1969 floods (determined from high-water marks and elevations recorded at gaging stations) and maps showing areas of inundation for design discharges are included. (Knapp-USGS)
W75-01824

GEOLOGIC ENVIRONMENT OF THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 8E.
W75-01846

EXPECTABLE EARTHQUAKES AND THEIR GROUND MOTIONS IN THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 8E.
W75-01847

VIRGIN RIVER PROJECT: A REGIONAL APPROACH TO MULTI-OBJECTIVE PLANNING FOR WATER RELATED RESOURCES,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 6A.
W75-01856

VELOCITY-HEAD ROD AND CURRENT METER USE IN BOULDER-STREWN MOUNTAIN STREAMS,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
B. H. Heede.
USDA Forest Service Research Note RM-271. August 1974. 4 p, 2 fig, 2 tab, 6 ref.

Descriptors: *Water measurements, *Current meter, *Channel flow, *Discharge(Water), *Velocity, Channels, Obstruction to flow, Hydraulics, Currents(Water), Flow rates, Stream regimen, Colorado, Rocky Mountain region.
Identifiers: *Velocity-head rod, *Vertical velocity gradients, *Boulder-strewn streams, High mountain streams.

The velocity-head rod should not be used in boulder-strewn mountain streams unless the gaged section can be modified to obtain uniform flow. The one-point current meter method will suffice for most operational purposes. (Forest Service)
W75-01862

FLOOD PLAIN INFORMATION, WELLS CREEK AND TRIBUTARIES, CITY OF ERIN, TENNESSEE.
Army Engineer District, Nashville, Tenn.
Prepared for the City of Erin, Tennessee. May, 1973, 28 p, 9 fig, 3 tab, 13 plates.

Descriptors: *Flooding, *Floodplains, *Flood protection, *Flood control, Historic floods, *Tennessee.
Identifiers: *Wells Creek(Tenn), *Erin(Tenn).

Past flooding from Wells Creek, Erin Branch and Musterground Creek has covered a portion of Erin located about 65 miles northwest of Nashville in the northwest corner of Tennessee. Floodplains are primarily agricultural for Wells Creek and Musterground Creek. Erin Branch with a gradient of about 35 feet per mile is the only stream which passes through a populated area with factories, commercial, residential areas and sewage treatment plant subject to flooding. Report data was meager as records from the only stream gage does not reflect the localized intense rainfall which can produce high rates of run-off over a small stream without creating abnormally high stages on adjacent streams. Most floods occur in late winter or early spring lasting three to four hours except on Wells Creek where flooding lasts about 12 hours. Interim ordinances have been adopted by the Erin Regional Planning Commission which restrict development in past flood areas. The Soil Conservation Service is studying possible flood protection measures. The March 1897 flood was probably the greatest, followed by the flood of April 3, 1968. Erin Branch crested at 428.2 feet, and Wells Creek crested 4 hours later at 400.7 feet with a peak discharge of 9,900 cfs. There was extensive damage. An Intermediate Regional Flood (IRF) would equal the flood of 1968 at an elevation of about 400 feet on Wells Creek. A Standard Project Flood would crest four feet higher. Both would cover a substantial part of Erin causing severe damage. (Salzman-North Carolina)
W75-01933

SPECIAL FLOOD HAZARD INFORMATION REPORT: TOMBIGEE RIVER, ABERDEEN TO AMORY, LOWER TOWN CREEK, MONROE COUNTY, MISSISSIPPI.
Army Engineer District, Mobile, Ala.
Prepared for Mississippi Research and Development Center, August, 1972. 9 p, 1 tab, 27 plates.

Descriptors: *Floods, *Floodings, *Flood control, *Channel improvement, *Flood proofing, Flood protection, Floodplain, Floodplain zoning, *Mississippi.
Identifiers: *Tombigbee River(Miss), Aberdeen(Miss), Amory(Miss), Town Creek(Miss), Monroe County(Miss).

Aberdeen, population 6,500 located on the west bluff of the Tombigbee River 10 miles north of the Monroe County line, and Amory, 7,200 population, 12 miles northeast of Aberdeen, are subject to flooding from the Tombigbee River. The river flows southward from Itawamba County for 442 miles to join the Alabama River. With a drainage area of 20,000 miles of which 2,210 square miles are above Aberdeen, the river slopes at about 1 1/2 feet per mile. Town Creek, draining 617 square miles flows 9.2 miles to flow into the Tombigbee River and has an average slope of 1 1/2 feet per mile. Approaches to the five bridges on the river and one on Town Creek may obstruct flood flow. Plans for protective measures of channel clearing, snagging, enlargment, and realignment will have no effect on large floods. Flood producing storms occur any season, but are more numerous in winter and spring when higher rates of runoff are the rule. The greatest flood occurred March, 1955 corresponding to a flood with a recurrence of about once in 60 years with an estimated discharge of 126,000 cubic feet per second (cfs). An Intermediate Regional Flood and Standard Project Flood would cause severe damage flooding 44,000 acres and 45,000 acres of land respectively. In or near channels velocities could be extremely hazardous to life and property. Elevations of future floods may be determined by use of topographic data and scale maps within report. (Salzman-North Carolina)
W75-01934

FLOOD PLAIN INFORMATION: PEARL RIVER-NEELY CREEK, VICINITY OF JACKSON, HINDS, RANKIN AND MADISON COUNTIES, MISS.
Army Engineer District, Mobile, Ala.
Prepared for Hinds, Madison, Rankin, Capital City Council of Governments, June, 1973. 21 p, 6 fig 7 tab, 17 plates.

Descriptors: *Levees, *Floods, *Flooding, Flood control, *Flood protection, Flood plain, Flood plain zoning, *Mississippi.
Identifiers: *Pearl River(Miss), *Neely Creek(Miss), *Jackson(Miss), Hinds, Rankin and Madison Counties(Miss).

Pearl River basin of approximately 8,760 sq mi., has an average annual rainfall of about 57 in. The river slopes at about .7 ft/mi. in the study reach and has a winding channel with numerous natural obstructions which inhibit flow. Neely Creek, a tributary, has its entire drainage area of 8.0 sq mi. within Jackson urban area. Within the primary reaches (1.8 mi.) discussed, streambed slopes at 12 ft/mi. and varies in width from 30 to 40 ft. Flood plain is mainly low agricultural and forest lands except in immediate area of Jackson which has industrial warehouses and sewage treatment plant. Essentially all flood plain development in Jackson area is protected by a levee system. Jackson Planning Board is developing zoning ordinances while Hinds County is creating similar proposals for the county. Major floods occur from winter and spring frontal type storms of long duration. Summer thunderstorms have a greater flooding effect on Neely Creek than Pearl River. On March 31, 1902, greatest flood crested at 37.5 ft. where flood stage is 29.1 ft., causing widespread damage in Jackson and surrounding agricultural areas. Most recent flood, December 21, 1961, crested at 37.2 ft. with severe flooding of residential and industrial areas of Jackson and Flowood with a subsequent 16-ft. break in the levee sending thousands of gallons of water into one area. An Intermediate Regional Flood and Standard Project Flood would crest at 39.8 ft. and 42.9 ft. respectively causing flood plain inundation, including new Jackson sewage treatment plant and sanitary landfill along Pearl River creating a pollution hazard, although many areas would be protected by the levee system as well as high elevation construction. (Salzman-North Carolina)
W75-01935

FLOOD PLAIN INFORMATION: RABBIT CREEK, ANCHORAGE, ALASKA.
Army Engineer District, Anchorage, Alaska.
Prepared for the Greater Anchorage Area Borough; May, 1973. 27 p, 12 fig, 2 tab, 29 plates.

Descriptors: *Flood plains, *Flood damage, *Erosion, *Flood profiles, *Flood forecasting, Flood stages, Obstruction to flow, Land use, Planning, Alaska.
Identifiers: *Rabbit Creek(Alas), *Anchorage(Alas), Flood plain management, Intermediate Regional Flood, Standard Project Flood.

Located 8 miles south of Anchorage, the rural Rabbit Creek area is in a state of rapid development. Properties along the stream are primarily residential and have been moderately damaged by the flood of June, 1964. Flood plain is narrow due to the steep gradient which averages 200 feet per mile in the study area. This causes floods of high velocities and erosion becomes a major problem. Floods will generally rise rapidly to their peak discharges and then recede almost as fast. Average annual precipitation is greater than 14 inches and average annual snowfall is greater than 76 inches. Intense precipitation causes summer and fall flooding. Rapid snowmelt following cold weather contributes to spring floods. Numerous stream crossings utilizing culverts create obstructions to flow. Descriptive information on historical floods was obtained primarily from interviews with residents. There are no gaging records. Based on statistics of streams with similar characteristics it was determined that an Intermediate Regional Flood (IRF) would have a peak flow of 550 cfs and a Standard Project Flood (SPF) a peak flow of 1440 cfs. During an IRF and SPF, average velocity of main channel flow would range from 7 to 9 and 10 to 12 feet per second, respectively, which is sufficient to move structures off their foundations. Damage would occur primarily as a result of erosion, which would also leave some areas isolated. (Diefendorf-North Carolina)
W75-01936

FLOOD PLAIN INFORMATION: MONONGAHELA RIVER, GREENE COUNTY, PENNSYLVANIA.
Army Engineer District, Pittsburgh, Pa.
Prepared for the Greene County Planning Commission and the Commonwealth of Pennsylvania, Department of Environmental Resources. June, 1974. 34 p, 10 fig, 5 tab, 11 plates.

Descriptors: *Flood control, *Flood forecasting, *Flood plains, Flood data, Flood profiles, Historic floods, *Pennsylvania, Land use, Planning, Locks, Dams, Reservoirs.
Identifiers: *Monongahela River(Penn), Greene County(Pa), Allegheny River, Ohio River, Pittsburgh, Flood plain management, Standard Project Flood, Intermediate Regional Flood.

Joining with the Allegheny River to form the Ohio River at Pittsburgh, this river was too wide and shallow for the development of water power or navigation until a series of locks and dams were constructed in 1840. However, rugged hills rising steeply above the narrow stream valley have kept the area relatively undeveloped, with the exception of some coal tipples and residences. Most floods occur from December to March due to heavy rainfalls and snowmelt, although intense thunderstorm rainfall can cause floods at any time. There are no significant obstructions to flood flow since the three bridges in the 25.7 mile study reach are significantly high. Largest historical flood was July 1888 with exact height unknown. A reading of 21 ft. at the upper gage of Lock and Dam 7 is considered a major flood. Gage height for the most recent major flood, March 1967, was 28.1 ft. with peak discharge of 145,000 cfs. Anticipated readings for Intermediate Regional Flood (IRF) are 30.4 ft., with a peak discharge of 168,000 cfs and for a Standard Project Flood (SPF), 33.3 ft. with peak discharge of 197,000 cfs. Three locks and dams are navigation structures with no flood control capacity, but the flood control dam and reservoir is effective in reducing flood crests by 2 to 4 ft. Authorized flood control dams on 2 tributaries would reduce major floods an additional 6 ft. or more. Although this study doesn't include specific plans for the solution of local flood problems, it can be used as a guide for solving problems and for planning the best utilization of lands subject to flooding. (Diefendorf-North Carolina)
W75-01937

DEVELOPMENT OF THE RIO GRANDE COMPACT OF 1938,
For primary bibliographic entry see Field 6E.
W75-01946

UNDERGROUND RESERVOIR MAKES ROOM FOR PARK ABOVE,
Sacramento Div. of Water and Sewers, Calif.
R. W. Jones.
The American City, Vol 89, No 4, April, 1974, p 65-66, 4 photo.

Descriptors: Reservoirs, *Reservoir construction, *Reservoir design, *Reservoir sites, *Recreation, *Water supply, Reservoir storage, *California.
Identifiers: *Sacramento(Calif), *Florin Reservoir(Calif).

Sacramento built a single reservoir, underground and out of sight, at a strategic, central location to solve its water needs. The facility increases also the city's recreational opportunities. As the city expanded, first to the north, then changing its growth to the south in the mid-1960's, water supply problems resulted including low water pressures in certain areas during peak summer months. After numerous studies, an economical and aesthetic solution was determined to build a reservoir underground so the space above could be used for a park. Using gas engine driven pumping units it would be possible to provide some degree of reliability that could be obtained with elevated storage. The 15 million gallon Florin Reservoir of rectangular cross section design with the floor sloping to an off-center sump delivers 33 mgd to the area. The underground pumping station used natural gas for fuel. Acoustically-treated fiber glass wall panels suppress noise. The land above the reservoir will be graded and transformed into a community park. If urban growth continues, the city plans to install a second underground structure that will double the present capacity. (Salzman-North Carolina)
W75-01951

DESIGN GUIDELINES FOR DISTRIBUTION SYSTEMS AS DEVELOPED AND USED BY AN INVESTOR-OWNED UTILITY,
California Water Service Co., San Jose.
For primary bibliographic entry see Field 6D.
W75-01954

THE RELATION OF RAINFALL NETWORK DENSITY TO ACCURACY OF RUNOFF PREDICTION IN A MOUNTAINOUS BASIN,
Colorado State Univ., Fort Collins.
For primary bibliographic entry see Field 2B.
W75-01969

CROPLAND ATLAS OF ARIZONA,
Arizona Crop and Livestock Reporting Service, Phoenix, Arizona.
For primary bibliographic entry see Field 7C.
W75-02047

THE EFFECT OF RAINFALL, SOIL MOISTURE AND HARVESTING INTENSITY ON GRASS PRODUCTION ON TWO RANGELAND SITES IN KENYA,
Food and Agriculture Organization of the United Nations, Nairobi (Kenya). FAO Range Management Div.
For primary bibliographic entry see Field 3F.
W75-02057

THE DUST CAME AT NOON,
For primary bibliographic entry see Field 4D.
W75-02058

MAP SHOWING DRAINAGE AREAS, MIDDLE HADDAM QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02129

MAP SHOWING DRAINAGE AREAS, ESSEX QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02133

MAP SHOWING DRAINAGE AREAS, CLINTON QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02134

MAP SHOWING DRAINAGE AREAS, DEEP RIVER QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02135

MAP SHOWING DRAINAGE AREAS, MOODUS QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02136

URBAN STORMWATER DRAINAGE PLANNING AND ENVIRONMENTAL DESIGN,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
A. J. Bonham.
Royal Australia Planning Institute Journal, Vol 12, No 3 and 4, p 86-89, July and October, 1974. 3 fig, 10 ref.

Descriptors: *Urban drainage, *City planning, *Flood protection, *Recreation facilities, Drainage systems, Storm drains, Urban runoff, Cities, Land Use, Flood plains, Design, Valleys, Natural streams.

In the past, urban drainage has often been largely ignored in the planning of growing cities; flood plains were considered to be ideal sites for intense development, and it was then necessary to construct lined arterial drainage channels with a design discharge restricted for reasons of cost. Yet there are certain urban land uses, particularly recreational, which will not suffer from occasional inundation by flood waters. Advantage may be taken of this by utilising natural drainage patterns to provide storm drainage and flood protection for surrounding built-up areas, thus preserving a part of the natural environment, if zones of regular and extreme flooding are identified at the very first stage of city planning. The design and engineering requirements of this type of development are described and discussed. (CSIRO)
W75-02170

EXPERIMENTAL EXAMINATION OF THE RATIONAL METHOD FOR SMALL RURAL CATCHMENTS,
New South Wales Univ., Kensington (Australia). School of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-02179

THE CONJUNCTIVE UTILISATION OF SURFACE AND GROUNDWATER SUPPLIES - A CASE STUDY,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 4B.
W75-02183

THE ULTIMATE WATER RESOURCES DEVELOPMENT OF THE UPPER CONDAMINE RIVER BASIN,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 6D.
W75-02184

ENVIRONMENTAL ASSESSMENT OF RAISING LESLIE DAM,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 6G.
W75-02185

RECREATIONAL USE OF INLAND WATER FACILITIES,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 6B.
W75-02189

4B. Groundwater Management

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA.
California State Water Resources Control Board, Sacramento.
For primary bibliographic entry see Field 6E.
W75-01708

STRESSES GENERATED IN NON-CIRCULAR TUNNEL CASINGS BY GROUNDWATER PRESSURE, (NAPRYAZHNENIYA, VOZNIKAYUSCHIYE V OBDELKAKH NEKRUGOVYKH TONNELEY OT DEYSTVIYA DAVLENIYA GRUNTOVYKH VOD),
For primary bibliographic entry see Field 8B.
W75-01762

RIVER INDUS RECHARGE AND REGENERATION,
MacDonald (Murdoch) and Partners, London (England).
P. A. Johnson.
The Institution of Civil Engineers, Proceedings, 1972 Supplement (iii), Paper 7455 S. 24 p, 10 fig, 9 tab, 1 ref.

Descriptors: *Water supply development, *Water quantity, *River systems, *Recharge, *Water demand, *Irrigation water, Winter, Cultivation, Water availability, Estimating, Water levels, Water table, Analytical techniques, *Groundwater, Measurement, Systems analysis, Equations.
Identifiers: *Barrages, *Indus River(W. Pakistan), *Regeneration, Recession curve.

The last barrage on the Indus system is at Kotri near Hyderabad. During summer, there is an abundant supply of water in the river to meet the irrigation demand, but in wintertime the next barrage upstream, at Sukkur, takes the whole discharge of the river and thus the Ghulam Mohammed Barrage at Kotri must rely on regeneration from groundwater for winter supplies. Predicting the quantity of water that can be expected at the barrage from regeneration is discussed. Three approaches to the problem, two of them essentially mathematical analyses and one based on detailed field measurements of water-table levels near the river, are examined. One of the analytical approaches involves the development of a composite recession curve from previous records, and the other consists mainly of a Fourier analysis treating the river level as an annual periodic function. The latter of these methods is shown to be more promising and close agreement is demonstrated between a calculated and an observed recession. (Bell-Cornell)
W75-01806

TEMPERATURE AND CHEMICAL DATA FOR SELECTED THERMAL WELLS AND SPRINGS IN SOUTHEASTERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2K.
W75-01814

SUBSURFACE GEOLOGY AND GROUNDWATER RESOURCES OF THE JACKSON PURCHASE REGION, KENTUCKY,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 2F.
W75-01817

CATALOG OF AQUIFER NAMES AND GEOLOGIC UNIT CODES USED BY THE WATER RESOURCES DIVISION,
Geologic Survey, Reston, Va.
For primary bibliographic entry see Field 2F.
W75-01819

DRAWDOWN IN COMPRESSIBLE UNCONFINED AQUIFER,
Birmingham Univ. (England). Dept. of Civil Engineering.
T. D. Streltsova.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 100, No Hy11, Proceedings Paper 10950, p 1601-1616, November 1974. 3 fig, 8 tab, 15 ref, 2 append.

Descriptors: *Pumping, Aquifers, *Water wells, *Aquifer characteristics, *Drawdown, Storage coefficient, *Groundwater, Compressibility, Mechanical properties, Elastic deformation, Hydraulic conductivity, Porous media, Hydraulics, Water table, Mathematics, Unsteady flow.
Identifiers: *Type-curve solution, Gravity drainage.

Elastic response of unconfined formations to pumping was considered. The nonequilibrium drawdown equation for a partially penetrating well discharging at a constant rate in an unconfined anisotropic aquifer of finite thickness was derived for the early period after pumping commences when abstraction of water is entirely due to the elastic deformation of the aquifer. This early stage precedes that described by Dagan's equation when the aquifer yields water by gravity drainage and desaturation. Solutions for the early drawdown, and for the late drawdown, were computed and were given in tables. Type curves plotted from the tables presented may be used for the curved-matching procedure to analyze pumping test data. (Sanderson-ISWS)
W75-01991

RECENT PALEOENVIRONMENTS AND GEOLOGICAL HISTORY AT MONTEZUMA WELL,
Northern Arizona Univ., Flagstaff.
R. H. Hevly.
Journal of the Arizona Academy of Science, Vol 9, No 2, p 66-75, June 1974. 9 fig, 3 tab, 28 ref.

Descriptors: *Sinks, *Artesian heads, *Geologic history, *Paleoclimatology, *Cores, Pollen, Limestones, Vegetation, Riparian plants, Trees, Aquatic plants, Pinyon pine trees, Juniper trees, Water levels, Sediment, *Arizona, Radioactive dating.
Identifiers: *Paleoenvironments, *Montezuma Well(Ariz).

Located in the Montezuma Castle National Monument near Camp Verde, Arizona, Montezuma Well is a limestone sink containing water supplied by artesian springs and drained by a cave connected to an adjoining creek. Data were obtained through studies of pollen extracted from two cores of sediment taken from Montezuma Well. Carbon-14 dating of fossil pollen indicates the formation of the well occurred more than 4000 years ago. Results include a description of climatic and vegetation changes over the history of the well as indicated by analysis of pollen data. The pollen record shows that the climate in the area of the well has essentially been the same for the past 2000 years. (Mastic-Arizona)
W75-02048

WIND, WATER AND WHEELS,
For primary bibliographic entry see Field 8C.
W75-02059

PRELIMINARY MAP SHOWING AVAILABILITY OF GROUND WATER FROM MAJOR GLACIAL-DRIFT AQUIFERS IN GRIGGS AND STEELE COUNTIES, NORTH DAKOTA,
Geological Survey, Grand Forks, N Dak.
For primary bibliographic entry see Field 7C.
W75-02123

FLASHING FLOW IN HOT WATER GEOTHERMAL WELLS: COMPUTER PROGRAM,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 7C.
W75-02124

WATER-RESOURCES APPRAISAL OF RAILROAD AND PENOYER VALLEYS, EAST-CENTRAL NEVADA,
Geological Survey, Carson City, Nev.
For primary bibliographic entry see Field 2E.
W75-02125

LAND-SURFACE SUBSIDENCE IN THE AREA OF BURNETT, SCOTT, AND CRYSTAL BAYS NEAR BAYTOWN, TEXAS,
Geological Survey, Austin, Tex.
R. K. Gabrysch, and C. W. Bonnet.
Water-Resources Investigations 21-74, September 1974. 48 p, 27 fig, 3 tab, 18 ref.

Descriptors: *Subsidence, *Withdrawal, *Oil fields, *Artesian aquifers, *Texas, Land subsidence, Water levels, Artificial recharge.
Identifiers: *Harris County(Tex), *Baytown(Tex).

Removal of water, oil, and gas from the subsurface in Harris County, Texas, has caused declines in fluid pressures, which in turn have resulted in subsidence of the land surface. Subsidence is becoming critical because much of the area is now subject to inundation by high tides. Production of oil and gas had caused as much as 3.25 feet of subsidence by 1925. Withdrawals of water from large-capacity industrial wells began about 1918. Significant subsidence of the land surface probably began about 1920 and as much as 8.2 feet of subsidence had occurred in the area by 1973. Probable future subsidence was calculated for two loading situations. Case I provided that the artesian heads would continue to decline at a rate of 6 feet per year until 1980 and then cease. Case II provided that artesian head in the Alta Loma Sand would continue to decline at a rate of about 6 feet per year until about 1995, when the potentiometric surface would reach the top of the Alto Loma Sand. The ultimate subsidence expected for case I and case II is 11.4 feet and 15.1 feet, respectively. However, only 1.4 feet of subsidence below present land surface would occur if artesian heads were maintained at their present levels. Subsidence can be halted in the near future only if artesian head is increased, either by decreasing pumpage or by repressurization by artificial recharge. (Knapp-USGS)
W75-02126

WATER RESOURCES OF THE UPPER NEUSE RIVER BASIN, NORTH CAROLINA,
Geological Survey, Raleigh, N.C.
For primary bibliographic entry see Field 2E.
W75-02127

CONTOUR MAP OF THE BEDROCK SURFACE, GREENFIELD QUADRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
For primary bibliographic entry see Field 7C.
W75-02130

MAP SHOWING DRAINAGE AREAS, SPRING HILL QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
For primary bibliographic entry see Field 7C.
W75-02131

CONTOUR MAP OF THE BEDROCK SURFACE, MOUNT TOBY QUANDRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
For primary bibliographic entry see Field 7C.
W75-02132

FLASHING FLOW IN HOT-WATER GEOTHERMAL WELLS,
Geological Survey, Menlo Park, Calif.
M. Nathenson.
Journal for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402 Price $2.75. Journal of Research of the U.S. Geological Survey, Vol 2, No 6, p 743-751, November-December 1974. 13 fig, 3 tab, 22 ref.

Descriptors: *Hydrothermal studies, *Geothermal studies, *Water wells, *Thermodynamics, *Groundwater movement, Boiling, Heated water, Steam, Water yield, Water temperature.
Identifiers: *Geothermal wells.

The production characteristics of hot-water geothermal wells which flash to steam-water mixtures in the cased part of the hole were analyzed. The flashing flow is assumed to be isenthalpic and, for purposes of calculating pressure drop, a finely dispersed mixture of equal average velocity. Water flow in the aquifer is treated using steady, radial Darcy flow. Calculations for a typical geothermal well show the effects on production of varying the system parameters of aquifer permeability, depth to water table, and base temperature. Field data from Wairakei, New Zealand, demonstrate the reductions in flow caused by mineral deposits in the bore. Data from Imperial Valley, Calif., agree well with calculated results. (Knapp-USGS)
W75-02138

THE CONJUNCTIVE UTILISATION OF SURFACE AND GROUNDWATER SUPPLIES - A CASE STUDY,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
N. M. Ashkanasy, and C. P. Hazel.
Civil Engineering Transactions, The Institution of Engineers, Australia, Vol CE16, No 2, p 108-114, 1974. 4 fig, 4 tab, 9 ref.

Descriptors: *Conjunctive use, *Optimum development plans, *Computer programs, Surface-groundwater relationships, Water resources development, Water supply, Artificial recharge, Model studies, Groundwater availability, Irrigation water, *Australia.
Identifiers: *Callide Valley(Qld).

The construction of a cooling-water dam in the Callide Valley of central Queensland, Australia, cut off the downstream groundwater flow in the Callide Creek, adding to problems of groundwater supply caused by the coincidence of an upsurge in irrigation activity with the driest period in the valley's history. The irrigated cash crop potential of the area is such that investigation into means of augmenting the natural recharge to the aquifers was clearly warranted. An analysis of the groundwater resources of the area is presented, together with a brief description of a computer program designed to provide a set of operating rules for augmenting inadequate groundwater supply by utilising surface water storage in excess of the needs of the primary purposes of the reservoir. In addition to its immediate application to the Callide Valley, the development of the program was of benefit in defining the factors of the system and identifying the needs for further data. (CSIRO)
W75-02183

4C. Effects On Water Of Man'S Non-Water Activities

HYDROLOGIC DATA FOR URBAN STUDIES IN THE DALLAS, TEXAS METROPOLITAN AREA, 1972,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 7C.
W75-01825

HYDRAULIC ANALYSIS OF FLOODFLOWS IN BUTTE BASIN AT STATE HIGHWAY 162, GLENN AND BUTTE COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 8B.
W75-01843

ENVIRONMENTAL IMPACT OF LAND USE ON WATER QUALITY: A WORK PLAN. BLACK CREEK STUDY, MAUMEE RIVER BASIN, ALLEN COUNTY, INDIANA. PLANNING PHASE. WORK PLAN. REDUCTION OF SEDIMENT AND RELATED POLLUTANTS IN THE MAUMEE RIVER AND LAKE ERIE.
Allen County Soil and Water Conservation District, Fort Wayne, Ind.
For primary bibliographic entry see Field 5C.
W75-01930

CHLORIDE BALANCE OF AN URBAN BASIN IN THE CHICAGO AREA,
Illinois Univ., Chicago. Dept. of Geological Sciences.
For primary bibliographic entry see Field 5B.
W75-01982

MAGNITUDE AND FREQUENCY OF FLOODS IN NEW JERSEY WITH EFFECTS OF URBANIZATION,
Geological Survey, Trenton, N.J.
S. J. Stankowski.
New Jersey Division of Water Resources, Trenton, Special Report 38, 1974. 46 p, 15 fig, 7 tab, 23 ref.

Descriptors: *Urbanization, *Urban hydrology, *New Jersey, *Floods, Storm runoff, Urban runoff, Flood frequency, Runoff forecasting, Flood forecasting, Rainfall-runoff relationships.

Mathematical and graphical relations are presented to estimate flood-peak magnitudes having selected recurrence intervals ranging from 2 to 100 years for drainage basins larger than one square mile with various degrees of existing or projected urban and suburban development in New Jersey. Four parameters are required for use of the relations. Three of these may be measured from topographic maps; namely, basin size, channel slope, and surface storage within the basin. The fourth is an index of manmade impervious cover, which can be determined for existing and future development conditions from census data and population projections that are readily available from regional, State, and local planning agencies. The relations were developed from an analysis of flood information for 103 sites in New Jersey; they should be useful for design of bridge waterway openings, selection of optimum size for drainage structures, evaluation of flood hazards for alternative land-use plans, and for definition of floodway and flood-hazard-area limits. Urban and suburban development increase flood peaks up to 3 times at the 2-year recurrence interval and up to 1.8 times at the 100-year recurrence interval as statewide averages. (Knapp-USGS)
W75-02119

4D. Watershed Protection

STAGES OF DEVELOPMENT OF GULLIES IN WESTERN UNITED STATES OF AMERICA,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
B. H. Heede.
Zeitschrift fur Geomorphologie, Vol 18, No 3, p 260-271, September 1974. 5 fig, 2 tab, 10 ref.

Descriptors: *Gullies, *Gully erosion, *Ephemeral streams, *Sediment load, *Sediment yield, *Streamflow, *Geomorphology, Suspended load, Alkali soils, Infiltration, Precipitation intensities.
Identifiers: Gully processes, Stream morphology, Stream net, Geomorphologic stages of development, Soil piping, Sodium soils, Pseudo-karst, *Western United States.

Present gully classification systems do not yield sufficient information for the land manager who is confronted with problems of priorities in gully control, erosion rates, and sediment yields in gullies. It is argued that gully development should be recognized in terms of land form evolution, proceeding from young to old age stages. Youthful and early mature stages of gully development were established. Comparison of hydraulic geometry of gullies with that of rivers suggests that the mature stage should be characterized by dynamic equilibrium. Although this stage was approached by some study gullies, its existence could not be verified. In ephemeral gullies, criteria of a mature gully stage may not be given by stream equilibrium alone, but may include other aspects of stability such as channel vegetation. Difficulties exist in predicting sediment production and yield for early stages of gully development. In ephemeral gullies, sediment loads are often more closely related to time and duration of flow than to magnitude of flow. Erosion rates during an individual flow depend not only on the stage of gully development, but also on the stability of the gully at the time of flow. (Forest Service)
W75-01861

FIELD AND COMPUTER PROCEDURES FOR GULLY CONTROL BY CHECK DAMS,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
B. H. Heede, and J. G. Mufich.
Journal of Environmental Management, Vol 2, p 1-49, 1974. 3 ref.

Descriptors: *Gully erosion, *Erosion control, *Check structures, *Sediment control, *Computer programs, *Construction costs, *Unit costs, *Benefits, Engineers estimates, Cost analysis, Surveys, Colorado, Rocky Mountain region, Arizona, New Mexico.
Identifiers: Structural gully control, Flow charts, Land inventory.

Computerized design of gully control by check dams eases field survey and design procedures. Only a minimum of data is required to generate the design of gully treatments and to yield essential information on costs and materials. Flexibility within the program is given by providing several design choices. Graphical computer output shows the relationships between the choices by effective dam height, total cost of treatment, and benefits from expected sediment deposits. Since key equations and their derivations are presented, the program can be adapted to dam types that differ from those used. The simplification of survey and design procedures makes feasible the inventorying of gully control needs for larger tracts of lands. The program is operational. (Forest Service)
W75-01863

FUNCTIONAL RELATIONSHIPS AND A COMPUTER PROGRAM FOR STRUCTURAL GULLY CONTROL,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 2J.
W75-01864

ENVIRONMENTAL IMPACT OF LAND USE ON WATER QUALITY: A WORK PLAN. BLACK CREEK STUDY, MAUMEE RIVER BASIN, ALLEN COUNTY, INDIANA. PLANNING PHASE. WORK PLAN. REDUCTION OF SEDIMENT AND RELATED POLLUTANTS IN THE MAUMEE RIVER AND LAKE ERIE.
Allen County Soil and Water Conservation District, Fort Wayne, Ind.
For primary bibliographic entry see Field 5C.
W75-01930

TOTAL SEDIMENT DISCHARGE SAMPLING OVER SILLS,
Forest Service (USDA), Cadillac, Mich. North Central Forest Experiment Station.
For primary bibliographic entry see Field 2J.
W75-01986

THE DUST CAME AT NOON,
B. I. Judd.
The Cattleman, p 64, 66, 74, May 1974.

Descriptors: *Droughts, *Soil conservation, *Dust storms, *Shelterbelts, *Wind erosion, Water conservation, Soil stabilization, Erosion, Southwest US.

History reveals a pattern of dry periods occurring every 40 years in the middle United States. Disaster potential is not as great as in the past, but it does exist. As a result of the great droughts of the 1930's, tree shelter belts were developed to slow the wind and hold the topsoil. Legislation such as the Soil Conservation Act and the Omnibus Flood Control Act were passed to establish soil and water conservation projects for controlling erosion and retarding water over upstream agricultural lands. Many of these conservation efforts and programs are currently ignored. Farmers and ranchers should not forget the importance of tree shelter belts and planting grasses to stabilize barren soil. The dry spells in the spring of 1971 in Texas and Oklahoma, and the 1973 dry spell in the Southwest indicate the demand for increased conservation and environmental watchfulness to prevent another Dust Bowl like that of the 1930's. (Mastic-Arizona)
W75-02058

EXPERIMENTAL EXAMINATION OF THE RATIONAL METHOD FOR SMALL RURAL CATCHMENTS,
New South Wales Univ., Kensington (Australia). School of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-02179

SIMULATION OF FLOW RECORDS FOR AN AUSTRALIAN CATCHMENT USING THE STANFORD WATERSHED MODEL IV,
University of Strathclyde, Glasgow (Scotland). Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-02180

SOIL AND WATER MANAGEMENT IN AREAS OF SOIL EROSION HAZARD,
Department of Primary Industries, Brisbane (Australia). Soil Conservation Branch.
H. W. Pauli.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia Report No 41, p 4.1-4.26, September 1974.

Descriptors: *Soil conservation, *Planning, *Administration, Soil erosion, Erosion control, Soil management, Surveys, Soil properties, Land management, Legislation, Project planning, Reimbursable costs, *Australia.
Identifiers: *Queensland(Aust).

During 1973, two valuable agricultural regions of Queensland were declared Areas of Soil Erosion Hazard under provisions of the State Soil Conservation Act. Activities of the Soil Conservation Branch within these areas, including data collection, project planning and implementation, and subsidy arrangements with landholders carrying out works, are described and discussed. The initiative has been taken by the State, but district participation is essential to the success of these activities. (CSIRO)
W75-02187

5. WATER QUALITY MANAGEMENT AND PROTECTION

5A. Identification Of Pollutants

HIGH PRECISION DETERMINATION OF CALCIUM IN THE PRESENCE OF HIGHER CONCENTRATIONS OF MAGNESIUM BY MEANS OF A COMPUTERIZED PHOTOMETRIC TITRATION - APPLICATION TO SEA WATER,
Goteborg Univ. (Sweden). Dept. of Analytical Chemistry.
For primary bibliographic entry see Field 2K.
W75-01658

INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS FOR MERCURY IN DOGS ADMINISTERED METHYLMERCURY CHLORIDE: USE OF A LOW ENERGY PHOTON DETECTOR,
Food and Drug Administration, Washington, D.C. Bureau of Foods.
M. H. Friedman, E. Miller, and J. T. Tanner.
Analytical Chemistry, Vol 46, No 2, p 236-239, February, 1974. 3 fig, 1 tab, 15 ref.

Descriptors: *Mercury, *Animal physiology, *Organic matter, *Neutron activation analysis, Analytical techniques, Mammals, Laboratory tests, Samples, Testing procedures, Laboratory animals, Biology, Instrumentation, *Pollutant identification.

Mercury has been determined by nondestructive neutron activation analysis in samples of brain tissue from beagles which had been fed methylmercury chloride. The mercury concentration was not uniformly distributed throughout the central nervous system and the fastest rise in concentration occurred in components of the visual system. The analytical procedure was capable of measuring mercury instrumentally and routinely in small samples of biological materials at approximately the 0.2 ppm level within a few days after irradiation with counting times. Comparative measurements showed that mercury determination based on Hg 197 could be done with greater sensitivity by using a Ge (Li) low energy photon detector rather than a conventional high resolution, high efficiency coaxial Ge (Li) detector. (Jernigan-Vanderbilt)
W75-01659

NONDISPERSIVE SOFT X-RAY FLUORESCENCE SPECTROMETER FOR QUANTITATIVE ANALYSIS OF THE MAJOR ELEMENTS IN ROCKS AND MINERALS,
California Univ., Berkeley. Lawrence Berkeley Lab.
For primary bibliographic entry see Field 2K.
W75-01663

NEW ELECTROCHEMICAL TECHNIQUE FOR THE SEPARATION OF LEAD AT TRACE LEVELS FROM NATURAL SILICATES,
Oxford Univ., (England). Dept. of Geology and Mineralogy.
J. W. Arden, and N. H. Gale.
Analytical Chemistry, Vol 46, No 1, p 2-9, January, 1974. 5 fig, 9 tab, 38 ref.

Descriptors: *Separation techniques, *Lead, *Silicates, *Electrochemistry, Inorganic compounds, Mass spectrometry, Analytical techniques, Testing procedures, Laboratory tests, *Pollutant identification.
Identifiers: *Sample preparation.

A rapid low blank method was described for the separation of lead by sequential cathodic and anodic deposition from a variety of matrices, especially complex natural silicates. The technique was especially suitable as a separative step for subsequent mass spectrometric isotopic analysis and for lead concentration determination by mass spectrometric isotope dilution; it is applicable to samples containing 10 ng of lead upwards and the combined electroseparation is more than 95% efficient at these levels. Methods were devised for overcoming all interferences, and the optimum conditions for both the cathodic and the anodic deposition of lead were studied. A technique has been developed for the dissolution of natural silicates which ensures recovery of more than 99% of the lead which they contain. (Jernigan-Vanderbilt)
W75-01669

CONCENTRATION AND DETERMINATION OF TRACE IMPURITIES IN COPPER BY ATOMIC ABSORPTION SPECTROPHOTOMETRY,
Canadian Copper Refiners Ltd., Montreal (Quebec).
W. Reichel, and B. G. Bleakley.
Analytical Chemistry, Vol 46, No 1, p 59-61, January, 1974. 3 tab, 17 ref.

Descriptors: *Copper, *Analytical techniques, *Spectroscopy, *Chemical precipitation, Selenium, Arsenic, Iron, Lead, Tin, Testing procedures, Laboratory tests, Instrumentation, Separation techniques, *Pollutant identification.

A simple coprecipitation technique for the quantitative separation and concentration of trace impurities in anode and blister copper was described. Lanthanum hydroxide was employed as the collector. Trace quantities of selenium, tellurium, arsenic, antimony, iron, lead, tin, and bismuth were separated from the copper matrix and subsequently determined by atomic absorption spectrophotometry from a single sample solution. Minor interferences caused by impurities and small amounts of coprecipitated copper were overcome by inclusion of calculated amounts of copper into multielement standards. Quantitative recoveries with relative standard deviations under 3% were obtained. The procedure effected considerable saving in time compared to traditional methods and is at least of comparable accuracy. A study of the behavior of lanthanum hydroxide on the precipitation of selenium was presented. (Jernigan-Vanderbilt)
W75-01670

MONITORING FOR TRACE METALS IN THE ATMOSPHERIC ENVIRONMENT: PROBLEMS AND NEEDS,
Chicago Dept. of Environmental Control, Ill.
P. R. Harrison.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972. National Environmental Research Center, Cincinnati, Ohio, p 123-144, February, 1973. 15 fig, 8 tab, 8 ref.

Descriptors: *Monitoring, *Trace elements, *Air pollution, Testing procedures, Analytical techniques, Distribution patterns, Conferences.

Monitoring for trace metals in the air involves literature search and choosing a collection and analysis method. The main needs of monitoring systems are: (1) a more positive capturing technique; (2) the capturing media must be relatively clean, homogeneous, and have a listed assay as required by any chemical reagent; (3) many of the extraction, separation, and chemical concentrative steps must be eliminated by increasing the sensitivity of the physical measuring devices. The monitors should use multiple sampling points to describe a region's exposure to any contaminent. Single point source sampling should be used only when the location is properly described in sufficient detail for the reader who may use such data to know precisely the limitations of such data. Therefore, there must be a careful selection of simpler sites, in order to advance the knowledge of elemental concentration distribution in the atmospheric environment one must rely upon the experience and expertise of several disciplines. (See also W74-09206)
W75-01693

MONITORING FOR TRACE METALS IN FOOD,
Department of Health, Education and Welfare, Washington, D.C.
E. O. Haenni.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio, National Environmental Research Center, Cincinnati, Ohio, p 153-158, February, 1973. 6 tab, 18 ref.

Descriptors: *Monitoring, *Trace metals, *Food, Testing procedures, Analytical techniques, Spectroscopy, Public health, Conferences.
Identifiers: Food and Drug Administration.

The Food and Drug Administration's role in the monitoring of trace elements in food is described, with particular emphasis on the analytical problems. This FDA program consists of periodic collection and analysis, as prepared for consumption, of twelve composited food categories representative of the two-week diet of a 15 to 20 year old male for the Northeastern, Southeastern, Central and Western regions of the United States. The brunt of the surveillance and monitoring work is borne by the District Laboratories of the FDA. The function of the Division of Chemistry and Physics, Bureau of Foods, is to undertake necessary analytical evaluation and/or development work in support of surveillance operations and to provide highly specialized and sophisticated analytical support services. The district laboratories also contribute to the analytical research and evaluation. These district functions are greatly facilitated by the advice of competent outside scientists assigned to each district laboratory as consultants. A most formidable task is still to be faced in the development of methodology and an even greater one in respect to the chronic toxicity and interactions of the less familiar metals. (See also W75-09206) (Jernigan-Vanderbilt)
W75-01696

MERCURY DETERMINATION IN WATER AND WASTE WATER WITH THE AID OF FLAMELESS ATOM ABSORPTION (QUECKSILBERBESTIMMUNG IN WASSER UND ABWASSER MIT HILFE DER FLAMMENLOSEN ATOMABSORPTION),
Beckman Instruments G.m.b.H., Munich (West Germany).
D. Mira, and H. A. Winkler.
Chemiker-Zeitung, Vol 98, No 5, p 233-235, 1974. 4 fig, 1 tab, 8 ref.

Descriptors: *Mercury, Sampling, Measurement, Surface waters, *Pollutant identification, *Spectrophotometry.
Identifiers: Germany, Atomic absorption(Flameless).

A quantitative method for the determination of total and inorganic mercury in water by flameless atomic absorption is described. For the determination of inorganically bound mercury, the water sample is combined with potassium permanganate solution, nitric acid, sulfuric acid, and hydroxylammonium chloride, after which tin chloride solution in sulfuric acid is added for the spectrometric determination. For the determination of the total mercury content, the sample is exposed to UV irradiation for 2 hrs for the digestion of organically bound mercury. The organic mercury content is determined from the difference of the total mercury and inorganic mercury levels. Actual measurements of the mercury levels in surface waters in Switzerland and West Germany revealed total mercury levels one order of magnitude below

the maximum allowable concentration of 1 microgram/liter, and organomercurial contents amounting to 80 percent of the total mercury. (Takacs-FIRL)
W75-01738

POSSIBILITIES OF WATER DATING BY MEANS OF INERT GAS ISOTOPES (AUBSLICK AUS DIE WASSERDATIERUNG MIT HILFE VON EDELGASISOTOPEN),
Bern Univ. (Switzerland). Physiologisches Institut.
For primary bibliographic entry see Field 2K.
W75-01739

COMPOSITION OF FREE LIPIDS IN SEDIMENTS OF THE TROPICAL WEST PACIFIC AND SOUTH ATLANTIC (SOSTAV SVOBODKYKH LIPIDOV DONNYKH OSADKOV ZAPADNOY TROPICHESKOY CHASTI TIKHOGO I YUZNOY CHASTI ATLANTICHESKOY OKEANOV),
A. N. Belyayeva.
Okeanologiya, Vol 14, No 1, p 77-81, 1974. 1 tab, 10 ref.

Descriptors: *Analytical techniques, *Chromatography, Lipids, Hydrocarbons, Organic matter, Decomposition, Sediments, Pollutant identification.
Identifiers: South Atlantic, Free lipids.

The composition of free lipids in the upper layers of low-siliceous diatomaceous ooze of the South Atlantic and calcarous foraminiferal, coral sediments and red clay of the tropical West Pacific was studied by a thin-layer chromatographic method, using methanol and a 2:1 ratio of chloroform methanol for extraction, and mixtures of hexane, ether and methanol for elution. The total free lipid content of these sediments was determined to range from 0.014 to 0.057 percent of dry sediment, the concentration being inversely related to the total amount of organic carbon content. The lipid carbon content amounted to 2.58-11.20 percent of the total organic matter. Lipids of low polarity made up 44.28-85.95 percent of the total lipid content, and they were dominated by hydrocarbons and fatty acids with contents of 8.57-29.97 percent and 2.12-9.15 percent, respectively. The triglyceride contents measured in shallow-water tropical sediments and antartic deep-water sediments were 1.81-6.97 percent and 2.12-9.15 percent, while tropical deepwater sediments contained no triglycerides. The concentration of sterols, more resistant to microbial degradation than fatty acids and triglycerides, was in a range of 3.57-9.90 percent in the lipids. The relative contents in the total lipids of compounds of low polarity, and especially of hydrocarbons, fatty acids and sterols can be indicative to the degree of transformation of organic matter of the sediment since these compounds possess different stability against microbial and hydrolytic decomposition in redox processes. (Takacs-FIRL)
W75-01744

WATER RESOURCES DATA FOR NEBRASKA, 1972: PART 2. WATER QUALITY RECORDS.
Geological Survey, Lincoln, Nebr.
Data Report, 1974. 166 p, 1 fig, 3 tab, 19 ref.

Descriptors: *Water quality, *Nebraska, *Basic data collections, Suspended load, Solutes, Streams, Surface waters, Groundwater, Hydrologic data, Dissolved solids.

The basic water-quality records for the 1972 water year for quality of water in Nebraska are compiled in this report. For convenience and interest, records for a few water quality stations in bordering States are included. The basic records include data on chemical quality, water temperatures, and suspended sediment. Records are of the quality of both ground and surface water. (Knapp-USGS)
W75-01818

POSSIBILITY OF A QUANTITATIVE DETERMINATION OF TWO CHEMICAL ANALOGS WITHOUT PRELIMINARY SEPARATION, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Geokhimii i Analiticheskoi Khimii.
I. E. Zimakov, and V. V. Atrashkevich.
Dokl Vses (Ordena Lenina) Akad S-Kh Nauk Im V I Lenina, 11, p 38-41, 1973.
Identifiers: Air pollution, Analogues, Animals, Chemical analysis, Disinfectants, Equations, *Heavy metals, *Isotopic dilution method, Pesticides, Water pollution sources, Pollutant identification.

The theoretical possibility of conducting a quantitative analysis without preliminary separation of elements is shown. The new method is a variant of the multiple isotopic dilution analysis method. Equations are derived for calculating unknown concentrations of 2 elements similar in chemical properties and present in a mixture in trace quantities. The proposed method can be used for developing specific techniques related to detection of heavy metal molecules which are highly toxic to man and animals. These metals are used often in pesticides, toxic disinfectants, agriculture and metallurgy; they can also be found in polluted air, fields and bodies of water.--Copyright 1974, Biological Abstracts, Inc.
W75-01848

RADIOCHEMICAL ANALYSIS FOR PB-210 AND PO-210 IN ENVIRONMENTAL SAMPLES,
New Mexico Highlands Univ., Las Vegas. Inst. of Scientific Research.
For primary bibliographic entry see Field 5B.
W75-01858

NEW METHODS FOR THE PREPARATION OF PERCHLORATE ION-SELECTIVE ELECTRODES,
Louisiana State Univ., New Orleans. Dept. of Chemistry.
T. J. Rohm, and G. G. Guilbault.
Analytical Chemistry, Vol 46, No 4, p 590-592, 1974. 4 fig, 7 ref. EPA R-800359.

Descriptors: *Chemical analysis, *Electrodes, Ion exchange, *Fabrication, *Analytical techniques, *Pollutant identification, Membranes.
Identifiers: *Ion-selective electrodes, Perchlorates.

Perchlorate-selective membranes were made by casting films 1 mm thick from a mixture of commercial liquid ion exchanger with half its weight of poly(vinyl chloride) (PVC) in THF solvent. Electrodes made by gluing the membranes to the ends of glass tubes, with perchlorate-chloride filling solution, and Ag-AgCl inner reference electrode were comparable to commercial perchlorate-selective electrodes in response, selectivity, and useful life. Electrodes made by coating a Pt wire with the perchlorate-PVC mixture had a somewhat shorter linear range of Nernstian response and a useful life of 2 weeks. (Hoover-EPA)
W75-01860

COMPARATIVE STUDY OF FATTY ACIDS EXTRACTED FROM THE FISH CTENOCHAETUS STRIATUS FROM TOXICOGENIC AND NON-TOXICOGENIC AREAS OF THE TAHITI LAGOON, (IN FRENCH),
Institut de Recherches Medicales, Papeete (French Polynesia). Laboratoire Municipale.
J. Lagraulet, G. Bereziat, G. Cuzon, and J. Polonovski.
Bull Soc Pathol Exot. Vol 66, No 1, p 235-239, 1973. English summary.
Identifiers: Alga, Chromatography, Ctenochaetus-striatus, *Fatty acids, Fish food, *Gas chromatography, Lagoons, *Tahiti, Toxicogenic, Toxins, Separation techniques, *Toxicity, *Pollutant identification, *Ciguatoxin.

Consumption of these fish by humans results in poisoning. The element responsible for this poisoning is the ingestion of ciguatoxin, which is believed to be produced by a benthic organism (alga). Herbivore fish constitute 1 of the primary links in a food chain in the process of which ciguatoxin becomes concentrated in the tissues of the fish. In this experiment muscle fragments of fish from toxogen and nontoxogen areas were analyzed by gas chromatography. Fish from toxogen zones contained less known fatty acids, seemingly the result of simplification and accompanying disappearance of long chain, highly unsaturated fatty acids.--Copyright 1974, Biological Abstracts, Inc.
W75-01865

THE RELATIVE DISTRIBUTION OF NON-AROMATIC HYDROCARBONS IN THE BALTIC IN SEPTEMBER 1971,
Kiel Univ. (West Germany). Institut fuer Meereskunde.
For primary bibliographic entry see Field 5B.
W75-01871

A SIMPLE METHOD FOR INVESTIGATION OF THE BIODEGRADABILITY OF PRODUCTS AND CONSTITUENTS IN WASTEWATER (EIN EINFACHES VERFAHREN ZUR PRUFUNG DER BIOLOGISCHEN ABBAUBARKEIT VON PRODUKTEN UND ABWASSERINHALTSSTOFFEN),
Farbwerke Hoechst AG, Frankfurt am Main (West Germany).
For primary bibliographic entry see Field 5B.
W75-01873

MASS SPECTROMETRIC IDENTIFICATION AND DETERMINATION OF ORGANOCHLORINE HYDROCARBONS IS FISH (MASSENSPEKTROMETRISHE IDENTIFIZIERUNG UND QUANTIFIZIERUNG VON CHLORKOHLENWASSER STOFFEN IN FISCH),
Institut fuer Meeresforschung, Bremerhaven (West Germany).
R. G. Schaefer.
Chemiker-Zeitung, No 5, p 241-247, May, 1974. 10 fig, 3 tab, 27 ref. English summary.

Descriptors: *Mass spectrometry, Fish, Polychlorinated biphenyls, Marine fish, DDT, Dieldrin, Computers, Analytical techniques, *Pollutant identification, Oil wastes, Oil pollution, *Chlorinated hydrocarbon pesticides, *Pesticide residues, Gas chromatography, DDE, DDD, Aldrin, Heptachlor.
Identifiers: Lindane.

Examined was the application of the gas chromatography/mass spectrometry combination method in the analysis of chlorinated hydrocarbons in marine fish. The following substances could be detected: p,p' -DDT, p,p' -DDD, p,p' -DDE, hexachlorobenzene, and several PCB isomers (tetra-, penta-, hexa-, hepta-, and octachlorobiphenyls). Lindane, heptachlor, and aldrin were not found. The detection of dieldrin was excluded by the applied clean-up procedure. The quantification is carried out by means of mass chromatography using a dedicated computer system. The lowest detectable quantities are discussed. (Prague-FIRL)
W75-01874

TRACE METAL CONCENTRATIONS IN BROWN SEAWEEDS, CARDIGAN BAY, WALES,
University Coll. of Wales, Aberystwyth. Dept. of Geology.
For primary bibliographic entry see Field 5B.
W75-01876

STUDY AND ASSAY OF 4, 6-DINITRO-O-CRESOL IN WATER, (IN FRENCH),
Lyon-1 Univ., Villeurbanne (France). Unite d'Enseignement dt de Recherche de Pharmacie.
Paul Chambon, and Renee Chambon.
J Chromatogr. Vol 87, No 1, p 287-289. 1973.
Identifiers: *Assay, *Chromatography, *Cresol compounds, Insecticides, Lakes, *Pesticide residues, Rivers, Water pollution sources, *Pollutant identification, Separation techniques.

An improved method for assaying the pesticide 4,6-dinitro-o-cresol (DNOC) in river and lake water is proposed. The technique described involves extraction of the DNOC in ether after acidification of the water sample with HCl with vigorous agitation for 15 min. The DNOC is separated by thin layer chromatography, eluted, and then assayed with a sensitivity close to 5 micrograms/liter.--Copyright 1974, Biological Abstracts, Inc.
W75-01881

MERCURY IN MAN,
Los Alamos Scientific Lab., N. Mex. Health Div.
P. C. Stein, E. E. Campbell, W. D. Moss, and P. Trujillo.
Archives of Environmental Health, Vol 29, No 1, p 25-27, July, 1974. 1 fig, 7 tab, 12 ref.

Descriptors: *Mercury, *Human pathology, Data collections, Analytical techniques, *Pollutant identification, New Mexico, Colorado.
Identifiers: Los Alamos(N Mex), Denver(Colo), Human kidney.

Mercury analyses were performed on tissues removed at autopsy from 47 human subjects from two geographical areas. Data obtained from lung, liver, and kidney could not be correlated with age, sex, of place of residence at the time of death. The highest concentrations of mercury were found in the kidney. Whether wet or dried tissue is analyzed does not affect the result. Data are presented to establish some base line for levels of mercury in a general population. (Sandoski-FIRL)
W75-01882

BIOLOGICAL ASSAY OF GYMNODINIUM BREVE TOXIN USING BRINE SHRIMP (ARTEMIA SALINA),
Texas Univ., Galveston. Medical School.
N. M. Trieff, M. McShan, D. Grajcer, and M. Alam.
Tex Rep Biol Med. Vol 31, No 3, p 409-422. 1973 Illus.
Identifiers: Artemia-Salina, Assay, Brine shrimp, Gymnodinium-Breve, Toxins, *Bioassay, *Dinoflagellate toxins, *Bioindicators, *Pollutant identification.

A biological assay method was developed using brine shrimp (A. salina). The study was directed particularly at determining toxicites of dinoflagellate toxins such as those from G. breve. Advantages of this assay concern the economy, small size, and adaptability of the organism. Effects of the parameters (container, number of brine shrimp per unit volume, temperature, and solvent or dispersing agent) were studied quantitatively on the assay for G. breve toxin. LD50 and ET50 values were obtained for the various solvents themselves and for G. breve culture and crude toxic extract. Energies of activation were obtained from the kinetic studies at different temperatures and a molecular mechanism was hypothesized to explain the results. --Copyright 1974, Biological Abstracts, Inc.
W75-01884

INCIDENCE AND SIGNIFICANCE OF POLYNUCLEAR AROMATIC HYDROCARBONS IN THE WATER ENVIRONMENT,
Pittsburgh Univ., Pa. Graduate School of Public Health.
J. B. Andelman, and J. E. Snodgrass.
Critical Reviews in Environmental Control, Vol 4, No 1, p 69-83, January, 1974. 9 tab, 69 ref.

Descriptors: *Aromatic compounds, *Reviews, Water analysis, Environmental effects, Chemical properties, Physical properties, Public health, *Pollutant identification, Analytical techniques.
Identifiers: Polynuclear aromatic hydrocarbons, 4-benapyrene.

Many polynuclear aromatic hydrocarbons (PAH) are carcinogenic to animals and probably to man. Most studies on the incidence of PAH in the water environment have been carried out in Europe with the need to establish hygienic standards for carcinogenic compounds being given more attention in the last few years. This review deals with the pertinent physicochemical properties of PAH, their analysis, origin, source, and transport in the environment, their presence in environmental waters, their removal or destruction by various treatment processes, and the possible health consequences to man of PAH in the water environment. The emphasis in on 3,4-benzpyrene. (Sandoski-FIRL)
W75-01885

ATOMIC ABSORPTION SPECTROSCOPY,
Michigan Univ., Ann Arbor. Dept. of Chemistry.
R. D. Braun, and J. P. Sapio.
Chemistry, Vol 47, No 6, p 9-13, June, 1974. 5 fig, 14 ref.

Descriptors: *Analytical techniques, Instrumentation, Methodology, Absorption, Water pollution sources, *Pollutant identification, *Spectroscopy, Trace elements.
Identifiers: *Atomic absorption analysis.

Atomic absorption analysis is a relatively simple, inexpensive, sensitive, and accurate method to determine trace amounts of numerous chemical elements. It has become a useful analytic method in clinical chemistry, geology, and pollution analysis. The methodology, theory, instrumental components, cells, light detection system, and interference are described. Interferences are spectral, chemical, and from ionization. (Sandoski-FIRL)
W75-01888

POLLUTION CONTROL STARTS WITH ANALYSIS.
Automation, Vol 21, No 6, p 84-85, June, 1974.

Descriptors: *Analytical techniques, Spectrometers, *Instrumentation, Mass spectrometry, Gas chromatography, Fluorescence, Infrared radiation, Ultraviolet radiation, *Pollutant identification, Spectrophotometry, Measurement.
Identifiers: Atomic absorption spectrometry.

Analytical instruments detect the presence and/or quantity of elements and chemical compounds in a sample. Presence is detected by comparing one or more uniquely distinctive physical properties of the sample with those of known standards. Spectroscopy is a highly reliable and versatile analytic technique. It can be employed in several ways to detect and measure certain constant physical characteristics of materials which produce predictable patterns. These can be matched against a known spectrum and thus be identified. The following spectrometric methods are described: atomic absorption spectrometry, infrared, ultraviolet, and visible spectrometry, fluorescence spectrometry, gas chromatography, and mass spectrometry. (Sandoski-FIRL)
W75-01889

APPARATUS FOR EXTRACTING A LIQUID SAMPLE AT VARIOUS DEPTHS OF A LIQUID STREAM,
Nielsen Engineering and Research Inc., Mountain View, Calif. (assignee)
For primary bibliographic entry see Field 7B.
W75-01894

MULTI-CAPACITY WATER SAMPLER,
For primary bibliographic entry see Field 7B.
W75-01903

STABILITY OF CRUDE OIL-IN-WATER EMULSIONS,
Department of the Environment, Ottawa (Ontario). Inland Waters Directorate.
For primary bibliographic entry see Field 5B.
W75-01912

THE DEVELOPMENT OF A TEST FOR THE POTABILITY OF WATER TREATED BY A DIRECT REUSE SYSTEM,
Cincinnati Univ., Ohio.
R. T. Christian, C. S. Clark, T. E. Cody, and R. Ling.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-771 131, $4.25 in paper copy, $2.25 in microfiche. Annual Summary Report, Report No 4, September, 1973. 27 p, 11 fig, 12 tab.

Descriptors: *Water reuse, *Testing procedures, *Systems analysis, *Water treatment, *Potable water, Treatment methods, Toxicity, Gas chromatography, Mass spectroscopy, Chemical analysis, Concentration, Pollutant identification.
Identifiers: Direct reuse water, Biological testing, Chemical testing.

A test system was developed to determine the potability of direct reuse water. The test system is composed of both a biological and chemical test. Mammalian cell culture is employed in the biological test system. The cell culture system is capable of distinguishing between direct reuse waters which have received different degrees of treatment. Cytotoxicity of certain metals included in drinking water standards has been demonstrated. The level at which such toxicity occurs is within an order of magnitude of the level specified in the standard. An analytical laboratory for the analysis of inorganic and organic contaminants in direct reuse water has been established. Gas chromatography-mass spectroscopy analysis has identified five compounds that are present in reverse osmosis permeate of direct reuse water: methanol, ethanol, acetone, isopropanol, and acetic acid. Several methods for preconcentration of such waters were studied. Promising techniques include adsorption and freeze concentration. Included for study were groups of mono- and dihydroxy-substitute phenolic compounds - hydroquinone, xylenols and pyrogallol. Plans are included for a bench scale water reuse system to supply water for chemical and biological test systems and to determine the effectiveness of the various unit processes. (Prague-FIRL)
W75-01919

POLYCHLORINATED BIPHENYLS IN TREATMENT PLANT EFFLUENTS,
Wisconsin Dept. of Natural Resources, Madison.
D. J. Dube, G. D. Veith, and G. F. Lee.
Journal Water Pollution Control Federation, Vol 46, No 5, p 966-972, May 1974. 3 fig, 4 tab, 8 ref.

Descriptors: *Polychlorinated biphenyls, *Chromatography, *Waste water treatment, Analytical techniques, *Wisconsin, Sampling, Cities, Domestic wastes, Municipal wastes, *Pollutant identification, Gas chromatography.

The amount of PCB contamination was determined in the waste water of 11 southeastern Wisconsin cities. Samples were taken of the inflowing waste stream, in the primary settling tank, in the trickling filter effluent, and in the final effluent of the treatment plant. Assay was done by gas-liquid chromatography. Results showed 6 of the 11 municipal treatment plants had effluent concentrations of 0.1 to 0.5 micrograms/liter of a compound which appeared to match the Arclor 1254 chromatogram. Two other municipalities had ef-

fluent concentrations of 1 microgram/liter of Aroclor 1254 equivalent. One city had a maximum of 42 micrograms/liter in effluent waters and 5.2 mg/liter in the digester sludge of Aroclor 1248 equivalent. These concentrations were quite variable with time. From the results it appears that treatment of domestic waters removes up to 70 percent or more of the PCB's in the inflowing waters. (Shaffer-FIRL)
W75-01921

DETECTION OF HEAVY METAL TOXICITY BY TETRAHYMENA PYRIFORMIS CULTURE METHOD,
Tokyo Univ. (Japan). Dept. of Hygiene and Preventive Medicine.
N. Yamaguchi, O. Wada, T. Ono, K. Yazaki, and K. Toyokawa.
Ind Health. Vol 11, No 1/2, p 27-31, 1973, Illus.
Identifiers: Culture method, *Heavy metals, Tetrahymena-pyriformis, *Toxicity, Pollutant identification.

A rapid, inexpensive and simple method using T. pyriformis was established for biological studies of heavy metal toxicity. The growth of this organism was highly sensitive to various kinds of heavy metals and was affected at concentrations of 10 to the minus 6 M of the metals. The degree of toxicity was clearly expressed by the protein concentration of the cultured T. pyriformis in media containing various concentrations of the metal. Cd and Hg inhibited most remarkably the growth of T. pyriformis and complete inhibition was observed at the concentration of 4 x 10 to the minus 6 M, while Se, Mn, Zn and Cu had less toxic effects, and Mg and Ca had no notable effect on the organism. Zn administered simultaneously with Cd reversed in inhibitory effect of Cd. Hg and Cd additively inhibited growth of the organism. The newly established method detects toxicity of heavy metals and also the mutual effect of 2 kinds of metal compounds on organisms.--Copyright 1974, Biological Abstracts, Inc.
W75-01945

CHARACTERIZATION STUDIES OF WASTEWATER GENERATED FROM MILITARY INSTALLATIONS,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 5B.
W75-01957

CHLORIDE BALANCE OF AN URBAN BASIN IN THE CHICAGO AREA,
Illinois Univ., Chicago. Dept. of Geological Sciences.
For primary bibliographic entry see Field 5B.
W75-01982

RAPID IDENTIFICATION OF OIL AND GREASE SPILLS FROM PULP AND PAPER MILLS BY INFRARED SPECTROSCOPY,
Continental Can Co., Inc., Augusta, Ga.
C. F. Bogatie.
Tappi, Vol 57, No 9, p 130-134, Sept. 1974. 10 fig, 3 tab, 6 ref.

Descriptors: Water pollution sources, Oil, *Oil spills, Oil pollution, *Pollutant identification, *Spectroscopy, *Spectrophotometry, *Water analysis, *Pulp wastes, *Analytical techniques, Infrared radiation.

An oil or grease spill in water can be rapidly identified through the use of an infrared absorbence ratio tree. A technique comparing ratios of infrared absorbency for specific frequency bands was adapted to oil and grease. Each oil and grease studied was found to have at least one characteristic and distinctive ratio. An infrared ratio tree was developed from the observed characteristic ratios to simplify the interpretation of spectra. Identification of an oil or grease should aid in locating the source of a spill, as well as in selecting the proper cleanup technique. (Sykes-IPC)
W75-02006

A NEW METHOD OF MEASURING THE OXYGEN DEMAND OF WATER,
Philips Gloeilampenfabrieken N.V., Eindhoven (Netherlands).
P. F. Butzelaar, and L. P. J. Hoogeveen.
Philips Technical Review, Vol 34, No 5/6, p 123-128, 1974. 4 fig, 1 tab.

Descriptors: *Chemical oxygen demand, *Organic matter, *Oxidation, *Water analysis, Water properties, Analytical techniques, Testing procedures, Water, Instrumentation, Automation, Monitoring, Surface waters, Water treatment, Water quality control, Automatic control, *Oxygen demand, *Pollutant identification.

A fast and simple method of measuring automatically how much oxygen is needed for the complete oxidation of organic matter present in surface water is described. The COD is determined by measuring the quantity of oxygen used up when a sample of water is oxidized at 900 C with oxygen in a constant carrier-gas flow in the presence of platinum. The oxygen is supplied and its partial pressure kept constant by a zirconia cell. The carrier gas is also passed through a second zirconia cell, which is set up by means of a control circuit in such a way that it brings the oxygen content to the value prevailing at the output of the first cell. The electric current that restores this value is a measure of the quantity of oxygen used up in the oxidation of the water sample. The total duration of the analysis is shorter than in other methods (about 2 min as against a few hr). The method is easily automated and lends itself to application both in monitoring networks and in control circuits for water treatment plants. (Witt-IPC)
W75-02009

MONITORING THE QUALITY OF SURFACE WATER,
Philips Gloeilampenfabrieken N.V., Eindhoven (Netherlands).
D. J. Kroon, and M. Q. Mengarelli.
Philips Technical Review, Vol 34, No 5/6, p 113-122, 1974. 7 fig.

Descriptors: *Instrumentation, *Pollutant identification, *Monitoring, *Water quality, *Water analysis, Chemical properties, Physical properties, Oxygen, Eutrophication, Oil pollution, Phenols, Taste, Odor, Trace elements, Computers, Data processing, Hydrogen ion concentration, Dissolved oxygen, Oxidation-reduction potential, Ions, Temperature, Turbidity, Conductivity, Calibrations, Pollutants, Organic compounds, Surface waters, Rivers, Lakes, Automatic control.

A system for monitoring the quality of surface water should provide prompt information about several simple physical and chemical parameters, parameters relating to oxygen balance and eutrophication, and also to the concentrations of malodorous components, mineral oils, phenols, certain trace elements, and organic micro pollutants. A combination of manual and automatic measurements appears to be the best. Many monitoring stations in an automatic network only measure one or two parameters, while a smaller number measure numerous parameters. The first type should be situated at places such as discharge sites and at the boundaries of the monitored area for which a particular mathematical model has been drawn up. The central computer is programmed with this model, enabling it to compute whether a dangerous situation may arise further downstream. Apart from these two types of monitoring stations, which are directly involved in monitoring the quality of the water, a third type is needed for checking whether the data obtained give a reliable picture of the water quality. A description is given of a water-monitoring station which contains instruments for measuring pH, oxygen concentration, oxidation-reduction potential, concentrations of certain ions (e.g., Cl), temperature, conductivity, and turbidity of water. It also has facilities for the automatic calibration of all sensors. (Witt-IPC)
W75-02010

DETERMINATION OF LIGNIN COMPOUNDS IN MILL EFFLUENTS AND SURFACE WATERS (OZNACZENIE ZAWARTOSCIZWIAZKOW LIGNINOWYCH W SCIEKACH POCELULOZOWYCH I WODACH POWIERZNIOWYCH),
Instytut Inzynierii Ochrony Srodowiska (Poland).
J. Zielinski, and S. Jurkiewicz.
Przeglad Papierniczy, Vol 30, No 5, p 182-188, May 1974. 4 fig, 3 tab, 64 ref.

Descriptors: *Water analysis, *Pollutant identification, *Pulp wastes, *Bleaching wastes, *Sulfite liquors, *Analytical techniques, Chemical analysis, Instrumentation, Colorimetry, Spectroscopy, Polarographic analysis, Chromatography, Spectrophotometry, Gravimetric analysis, Volumetric analysis, Gas chromatography, Fluorescence, Fluorometry, Standards, Effluents, Organic loading, Industrial wastes, Pulp and paper industry.

The chemical composition of sulfite and kraft pulp mill and bleach plant effluents is reviewed, as it affects the pollution load of mill discharges into streams. Modern analytical instrumental methods for determining lignins (notably alkali lignin, lignosulfonic acids and lignosulfonate salts, and chlorolignins) in mill effluents and natural receiving waters are discussed. Comparative merits are described for gravimetric, colorimetric (tyrosine and nitrosolignin), polarographic (methylene blue and methyl violet,), chromatographic (gas and thin-layer), and spectrophotometric (ultraviolet, infrared, and fluorescence) techniques. Acidimetry and the vanillin method are also mentioned. Difficulties encountered in water analyses for lignins are pointed out, including the lack of standards. (Stapinski-IPC)
W75-02020

INFORMATION CONTENT AND INTERPRETATION OF WASTE WATER INDICES, ESPECIALLY POTASSIUM PERMANGANATE (CONSUMPTION), COD, TOC AND BOD (AUSSAGEFAEHIGKEIT UND INTERPRETATION VON ABWASSERKENNZAHLEN, INSBESONDERE KMNO(4), COD, TOC, UND BSB),
Chemiefaser Lenzing A.G. (Austria).
R. Hornke.
Wochenblatt fuer Papierfabrikation, Vol 102, No 6, p 199, 201-203, March 31, 1974. 2 fig, 6 ref.

Descriptors: *Water analysis, *Pollutant identification, *Biochemical oxygen demand, *Chemical oxygen demand, Analytical techniques, Oxygen demand, Waste water(Pollution), Organic compounds, Dissolved solids, Organic loading, Potassium compounds, Oxidation, *Waste identification.
Identifiers: *Total Organic Carbon, Oxidizability, Potassium permanganate, Permanganate number, Potassium dichromate.

After defining the concept of waste water oxidizability, a review is given of wet and dry oxidation methods for the determination of organic dissolved substances in waters and waste waters, particularly the applicable range and limitations of the potassium permanganate method. Advantages and disadvantages of the potassium dichromate method for measurements of COD and TOC (total organic carbon) are discussed. The principles of BOD determination are outlined, and various modifications of BOD tests are described, including those developed by Sierp and Fransemeier, Warburg, and Popel and Steinecke. (Speckhard-IPC)
W75-02028

COMPARISON OF ANALYTICAL METHODS FOR THE DETERMINATION OF SUSPENDED SOLIDS IN PULP AND PAPER MILL EFFLUENTS,
ITT Rayonier, Inc., Shelton, Wash.
D. S. Rogers, and D. K. Kendall.
In: Preprinted Proceedings TAPPI Environmental Conference, New Orleans, Louisiana, April 17-19, 1974, (TAPPI, Atlanta, Ga.), p 177-183, (1974). 3 fig, 2 tab, 6 ref, 1 appendix.

Descriptors: *Water analysis, *Pollutant identification, *Suspended solids, Waste water(Pollution), *Industrial wastes, *Pulp wastes, Filtration, *Analytical techniques, *Sulfite liquors, Filters, Asbestos, Effluents, Clogging, Fibrous beds.
Identifiers: Glass fibers, Filter paper.

The reliability and accuracy of four different analytical procedures for effluent suspended solids were compared. A glass fiber filter disk gave significantly higher results than a method using Whatman No. 41 filter paper when tested on the extended outfall from a sulfite pulp mill. Statistically similar results were obtained with frequently greater speed by a disk filter combining glass with asbestos fibers, since the asbestos mat provided in-depth filtration and prevented the glass fiber disk from becoming clogged. Using the combination disk filter would seem to improve the results obtained by the EPA procedure. (Sykes-IPC)
W75-02039

SHORT-TERM BIOASSAYS OF LOW-O2-CONTENT EFFLUENTS,
For primary bibliographic entry see Field 5C.
W75-02041

ENZYMATIC DETERMINATION OF ZINC BELOW ONE PART PER BILLION,
Geneva Univ. (Switzerland). Dept. of Biochemistry.
P. Lehky, and E. A. Stein.
Analytica Chimica Acta, Vol 70, No 1, p 85-93, May 1974. 4 fig, 1 tab, 12 ref. Swiss NSF(4740)+(3.652.71).

Descriptors: *Zinc, *Animal physiology, *Enzymes, *Analytical techniques, Catalyst, Ions, Assay, *Trace elements, Testing procedures, Hogs, Copper, Cobalt, Nickel, *Pollutant identification, Chemical analysis.

A stable and very sensitive reagent for the determination of zinc was obtained by removing zinc from pig kidney aminopeptidase, a commercially available metalloenzyme. Up to a given limit, the enzymatic activity of the reagent was strictly proportional to the concentration of zinc ions in the assay system. Aminopeptidase activity was determined by measuring the ratio of release of p-nitroaniline from the chromogenic substrate L-leucine-p-nitroanilide. Thus, with a simple recording photometer, rapid and accurate determinations of free zinc ions in concentrations ranging from 5 pg-10 micrograms/ml could be achieved. The selectivity of the method was such that 0.1 ngZn/ml could be assayed in the presence of 10-100-fold molar amounts of a wide array of other cations with a relative error below 10%. The analytical procedure was extended to the assay of Cu(2+), Co(2+) and Ni(2+) in the ng/ml range. (Jernigan-Vanderbilt)
W75-02060

MERCURY CONCENTRATIONS IN FISH FROM THE GREAT SMOKY MOUNTAINS NATIONAL PARK,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5C.
W75-02061

CATALYTIC DETERMINATION OF TRACE AMOUNTS OF VANADIUM BY MEANS OF THE CHROMOTOPIC ACID-BROMATE REACTION,
Yamanashi Univ., Kofu (Japan). Dept. of Applied Chemistry.
T. Yamane, T. Suzuki, and T. Mukoyama.
Analytica Chimica Acta, Vol 70, No 1, p 77-83, May 1974. 3 fig, 2 tab, 6 ref.

Descriptors: *Trace elements, *Analytical techniques, *Spectroscopy, *Heavy metals, Oxidation, Laboratory tests, Testing procedures, *Pollutant identification, Chemical analysis.
Identifiers: *Vanadium.

An investigation of the vanadium-catalyzed oxidation of chromotropic acid by bromate and a catalytic method for determining trace amounts of vanadium based on this catalytic reaction were described. The method allows a simple determination of vanadium as low as 5 ng with good accuracy. The reaction was followed spectrophotometrically by measuring the rate of change in absorbance of chromotropic acid at 430 nm. Of the many ions examined, iron (III), copper and tungsten (VI) interfered seriously at 100-fold concentrations. The relative standard deviation for 20 ng of vanadium (10 determinations) was 2.5%. (Jernigan-Vanderbilt)
W75-02063

DETERMINATION OF CADMIUM IN AIR PARTICULATES BY FLAMELESS ATOMIC ABSORPTION SPECTROMETRY WITH A GRAPHITE TUBE,
Ghent Rijksuniversiteit (Belgium). Instituut voor Nukleaire Wetenschappen.
M. Janssens, and R. Dams.
Analytica Chimica Acta, Vol 70, No 1, p 25-33, May 1974. 3 tab, 3 fig, 13 ref.

Descriptors: *Cadmium, *Analytical techniques, *Filters, *Aerosols, Laboratory tests, Absorption, *Pollutant identification, Spectrophotometry, Air pollution.

A sensitive and selective determination of cadmium in aerosols by flameless atomic absorption spectrometry was described. By two successive treatments in 0.1M suprapure nitric acid, the cadmium was removed from the paper filter on which the particulates were collected. Routinely 10-50 microliters of the 100-ml solution were injected into a graphite oven and the % absorption at 228.8 nm was measured. If half a 24-h filter (400 cu m air) was used, the dilution was made to 50 ml and 50 microliters was injected, an unusually low concentration of 0.20 ng/cu m could be determined quantitatively with a relative standard deviation of 10%. The reproducibility of the complete procedure was 4.8%. An interlaboratory comparison indicated that the accuracy was very good. (Jernigan-Vanderbilt)
W75-02064

IDENTIFICATION OF METALS IN LUNG FROM A PATIENT WITH INTERSTITIAL PNEUMONIA,
Medical Coll. of Wisconsin, Milwaukee. Dept. of Anatomy.
K. A. Siegesmund, A. Funahashi, and K. Pintar.
Archives of Environmental Health, Vol 28, No 6, p 345-349, June 1974. 9 fig, 10 ref.

Descriptors: *Distribution, *Heavy metals, *Public health, *Human pathology, Human physiology, Trace elements, X-rays, Electron microscopy, Analytical techniques, Spectroscopy, Cobalt, Iron, Chromium, Nickel, *Pollutant identification.
Identifiers: Lungs.

The application of the techniques of energy dispersion x-ray analysis (EDXA) or nondispersive x-ray analysis to the identification of the elemental composition of foreign material seen in thin sections of lung tissue was described. A light and electron microscopical study of a patient with interstitial pneumonitis-fibrosis was made. The EDXA of electron-dense particles in the macrophages from the lung of this patient identified the particles as containing cobalt, iron, chromium, and nickel. Cobalt has been implicated as one of the possible causes of interstitial pneumonitis-fibrosis in industrial workers. The technique described may be useful for the discrete localization and accurate identification of certain toxic elements in tissue. (Jernigan-Vanderbilt)
W75-02066

DETERMINATION OF FOURTEEN ELEMENTS IN PURE IRON BY DESTRUCTIVE NEUTRON ACTIVATION ANALYSIS,
Rijksuniversiteit (Belgium). Instituut voor Nukleaire Wetenschappen.
C. de Wispelaere, J. P. Op de Beeck, and J. Hoste.
Analytica Chimica Acta, Vol 70, No 1, p 1-15, May 1974. 3 tab, 7 fig, 21 ref.

Descriptors: *Iron, *Separation techniques, *Cation exchange, *Anion exchange, Trace elements, Tin, Resins, Copper, Cobalt, Zinc, Gold, Nickel, Chromium, Arsenic compounds, *Pollutant identification, Chemical analysis.

A method was presented for the determination of fourteen elements in pure iron by means of destructive thermal activation analysis. By means of an anion- and cation-exchange procedure in 1M hydrofluoric acid, the iron matrix was separated from a large number of elements, which were further separated in groups. W, Mo, Ta, Sn, Sb and Sc were found and measured as one group on the anion-exchange resin. Cu and Co, and Zn and Ag, were two groups obtained from the cation exchange procedure. For the elements Ga, Ni, Cr and As which could not be included in the general group separation scheme, special individual methods were described. (Jernigan-Vanderbilt)
W75-02067

(COMMENT ON THE STORAGE OF MERCURY IN SURFACE WATER),
California State Dept. of Water Resources, Sacramento. Chemistry Lab.
G. N. Gaston, and A. K. Lee.
American Water Works Association Journal, Vol 66, No 8, p 495, 506, August, 1974. 2 tab, 10 ref.

Descriptors: *Storage, *Mercury, Surface waters, Chemical reactions, Organic compounds, Inorganic compounds, Regulations, Potable waters, Aqueous solutions, Preservation, Pollutant identification.

The purpose was to assess the effect of pH, potassium permanganate, and container materials on the storage of mercury in surface water samples; to utilize a concentration of mercury that is significant in relation to the proposed 2 microgram/l limit in drinking water; and to use both organic and inorganic mercury. Organic and inorganic mercury in surface water at the 1 microgram/l level could be successfully stored for up to four weeks when adjested to pH 1.0 with nitric acid or pH 1.0, 2.0, and 3.0 with excess potassium permanganate. Adjustment to pH 1.0 with HNO_3 without K MnO_4 was advantageous because of less potential contamination and also other analyses could be performed readily from the same sample. (Jernigan-Vanderbilt)
W75-02071

THE USE OF AUXILIARY COMPLEXING AGENTS IN THE DIFFERENTIAL COMPLEXIMETRIC TITRATION OF ZINC AND CADMIUM WITH THERMOMETRIC END-POINTS,
Nagoya Inst. of Tech., Nagoya (Japan).
K. Doi, and M. Tanaka.
Analytica Chimica Acta, Vol 71, No 2, p 464-467, August, 1974. 2 tab, 3 fig, 6 ref.

Descriptors: *Zinc, *Cadmium, *Volumetric analysis, Laboratory tests, Testing procedures, Chemical reactions, Temperature, *Pollutant identification, Chemical analysis.

The use of auxiliary complexing agents in the differential complexiometric titration of metals with a thermometric end-point was discussed. The differential thermometric determination of mixtures of zinc and cadmium was given as an example. Cadmium-ammine complexes were titrated first with EGTA in an exothermic reaction and the zinc-ammine complexes subsequently reacted endothermically. The end-point for cadmium was easily determined at the intersection of the extrapolated exothermic and endothermic portions of the thermometric titration curves, as in the thermometric titration of a mixture of calcium and magnesium. Both zinc and cadmium gave exothermic reactions in the absence of ammonia. Thus, the differential determination of zinc and cadmium is possible by means of thermometric titration. (Jernigan-Vanderbilt)
W75-02072

INTERFERENCE OF ALUMINUM IN THE ATOMIC ABSORPTION DETERMINATION OF CADMIUM USING SODIUM DIETHYLDITHIOCARBAMATE AS CHELATING AGENT,
Abbott Labs., North Chicago, Ill. Analytical Research Dept.
E. E. Kaminski.
Analytical Chemistry, Vol 46, No 9, p 1304-1305, August, 1974. 3 tab, 5 ref.

Descriptors: *Cadmium, *Analytical techniques, Aluminum, Laboratory tests Chemical reactions, Testing procedures, Ions, Solvents, Chelation, *Pollutant identification, *Spectrophotometry, Chemical analysis.

Sodium diethyldithiocarbamate (NDDC) is often used as a chelating agent in extraction of cadmium for analysis because it is operative over a wide pH range. However, care should be exercised in pH adjustment of cadmium solutions if aluminum is present, because cadmium will coprecipitate with aluminum hydroxide. The problem was eliminated by complexing the aluminum with tartrate prior to pH adjustment. Samples containing 40, 80, and 120 ppb Cd and 1000 times as much aluminum were extracted with methylisobutylketone (MIBK) and back extracted into the aqueous phase. The extraction of cadmium was complete with tartrate present to prevent precipitation of aluminum. (Jernigan-Vanderbilt)
W75-02074

DETERMINATION OF COPPER IN COMPLEX MATRICES BY NEUTRON ACTIVATION ANALYSIS USING X-RAY DETECTION,
Virginia Univ., Charlottesville. Dept. of Chemistry.
R. O. Allen, and W. Brookhart.
Analytical Chemistry, Vol 46, No 9, p 1297-1299, August, 1974. 3 fig, 2 ref.

Descriptors: *Copper, *Analytical techniques, *Neutron activation analysis, Radioisotopes, *X-Rays, Spectroscopy, Instrumentation, Aqueous solutions, Standards, Iron, Zinc, Pollutant identification, Chemical analysis.

Copper was measured in solutions containing varying concentrations of sodium, in biological materials, and in several USGS standard rocks using x-ray detection in conjunction with normal gamma-ray spectrometry. Detection by gamma-ray spectrometry was hindered because only 0.5% of the decays gave rise to a 1.34 meV gamma-ray which fell on the broad base of the large 1.368 MeV peak from Na24. The sensitivity for Cu64 could be improved since 43% of the decays were by electron capture giving rise to characteristic x-rays. The use of Si(Li) detectors to complement gamma-ray spectrometry for instrumental neutron activation analysis was possible, even in complex matrices. Sensitivity was improved and the analytical procedure was easier when samples used were infinitely thick for the energy of x-ray being measured. High iron contents interfere with Cu analysis, particularly in geological materials. (Jernigan-Vanderbilt)
W75-02075

HOT ATOMIC ABSORPTION SPECTROMETRY METHOD FOR THE DETERMINATION OF MERCURY AT THE NANOGRAM AND SUBNANOGRAM LEVEL,
National Cancer Inst., Frederick, Md. Frederick Cancer Research Center.
H. J. Issaq, and W. L. Zielinski, Jr.
Analytical Chemistry, Vol 46, No 11, p 1436-1438, Setpember, 1974. 5 fig, 15 ref.

Descriptors: *Mercury, *Analytical techniques, Aqueous solutions, Absorption, Toxicity, Public health, Inorganic compounds, Statistics, *Pollutant identification, *Spectrophotometry, Chemical analysis.
Identifiers: Atomic absorption spectroscopy, Microanalysis.

Atomic absorption spectrometry having a heated graphite atomizer was used to observe a 50-fold Hg signal enhancement when hydrogen peroxide was added (1% v/v) to aqueous mercury solutions. The sensitivity and detection limits were 0.0002 microgram/1% absorption and 0.00016 microgram, respectively. A precision of 1.3% and signal-to-noise ratio of 88 were obtained. Parameters which influence the analytical sensitivity were evaluated. There was no change in the mercury signal when hydrogen peroxide was varied from 0.5% to 4% (v/v). The optimum drying and atomizing temperature ranges were 115-140C and 2150-2300C, respectively, and an optimum drying time range of 50 to 120 seconds was observed. The method described is faster, simpler, and more sensitive than the flameless vapor method, and is less prone to contamination and interference effects. (Jernigan-Vanderbilt)
W75-02078

APPLICATION OF A DEMOUNTABLE HOLLOW CATHODE LAMP AS A SOURCE FOR THE DIRECT DETERMINATION OF SULFUR, IODINE, ARSENIC, SELENIUM, AND MERCURY BY ATOMIC ABSORPTION FLAME SPECTOMETRY,
Imperial Coll. of Science and Technology, London (England). Dept. of Chemistry.
G. F. Kirkbright, and P. J. Wilson.
Analytical Chemistry, Vol 46, No 11, p 1414-1418, September, 1974. 7 fig, 2 tab, 10 ref.

Descriptors: *Analytical techniques, *Trace elements, Toxicity, Volatility, Arsenic compounds, *Mercury, Laboratory tests, *Pollutant identification, *Spectrophotometry, Chemical analysis.
Identifiers: *Selenium, *Sulfur, *Iodine.

A commercially available demountable hollow cathode lamp was evaluated as a sharp line source for the determination of the volatile elements arsenic, selenium, mercury, sulfur, iodine, and phosphorus which have principal resonance lines at wavelengths less than 200 nm. A comparison of this source with microwave excited electrodeless discharge lamps for these elements was described. The demountable hollow cathode lamp could provide intense emission and high signal-to-background intensity ratios at the short wavelength resonance lines for arsenic, selenium, mercury, iodine and sulfur. Good long-term stability was also attainable for these elements with this lamp; the lamp sources provide readily for the rapid interchange of graphite cathodes containing different elements. No difficulty was observed in operation with deposition of the cathode filler material on the internal surfaces of the lamp envelope with the water-cooled cathode and low operating currents employed. (Jernigan-Vanderbilt)
W75-02080

ACCURATE DETERMINATION OF TEN MAJOR AND MINOR ELEMENTS IN SILICATE ROCKS BASED ON SEPARATION BY CATION EXCHANGE CHROMATOGRAPHY ON A SINGLE COLUMN,
National Chemical Research Lab., Pretoria (South Africa).
For primary bibliographic entry see Field 2K.
W75-02081

ORGANOCHLORINE RESIDUES, MERCURY, COPPER AND CADMIUM IN YELLOW PERCH, WHITE BASS, AND SMALLMOUTH BASS, LONG POINT BAY, LAKE ERIE,
Canada Centre for Inland Waters, Burlington (Ontario).
For primary bibliographic entry see Field 5C.
W75-02082

THE DETERMINATION OF TIN BY CARBON FILAMENT ATOMIC ABSORPTION SPECTROMETRY,
Johnson-Matthey Chemicals Ltd., Royston (England).
G. L. Everett, T. S. West, and R. W. Williams.
Analytica Chimica Acta, Vol 70, No 2, p 291-298, June, 1974. 5 fig, 3 tab, 12 ref.

Descriptors: *Tin, *Analytical techniques, Aqueous solutions, Instrumentation, Standards, Cadmium, Manganese, Chromium, Calcium, Nickel, Aluminum, Iron, *Pollutant identification, *Spectrophotometry, Chemical analysis.
Identifiers: *Atomic absorption spectroscopy.

The atomic absorption characteristics of tin on a carbon filament atom reservoir were described. The behavior of tin in aqueous solution as tin (II) chloride, in xylene as tin octoate and in oil solutions was studied. The interference effects of a selected range of seven cations, added as chlorides in aqueous solution or as naphthenates in non-aqueous media, and of sulphate and phosphate were examined. In all cases, the signals were measured in the filament reservoir with a surrounding hydrogen diffusion flame. The 1% absorption sensitivity in the organic media at the 286.3 nm line was 10 to the minus 10th g and 9 x 10 to the minus 11th g in aqueous solution. In the latter medium, the corresponding sensitivity at 224.6 nm was 6.7 x 10 to the minus 11th g. The linear analytical range lay in the region 0 to 20 ng. (Jernigan-Vanderbilt)
W75-02083

THE DIRECT DETERMINATION OF CADMIUM IN BIOLOGICAL SAMPLES BY SELECTIVE VOLATILIZATION AND GRAPHITE TUBE RESERVOIR ATOMIC ABSORPTION SPECTROMETRY,
National Environmental Research Center, Research Triangle Park, N.C. Pesticides and Toxic Substances Effects Lab.
R. T. Ross, and J. G. Gonzalez.
Analytica Chimica Acta, Vol 70, No 2, p 443-447, June 1974. 1 fig, 2 tab, 21 ref.

Descriptors: *Cadmium, *Organic matter, *Volatility, Analytical techniques, Physical properties, Sampling, Trace elements, *Spectrophotometry, *Pollutant identification, Chemical analysis.
Identifiers: Graphite tube furnace, *Sample preparation.

A direct graphite tube furnace method was adapted for the direct determination of cadmium in urine and serum. The Initial application of the method for the measurement of cadmium in biological materials resulted in spectral and chemi-

cal interferences which were due to the formation of smoke from charring of the organic matter and inorganic salts in the matrix. This resulted in non-specific absorption and led to high cadmium readings. Elimination of these interferences was accomplished by using a deuterium arc background corrector. At 1300 C the cadmium peak was clearly differentiated, however, when the temperature was raised to 1700 C and higher, salt volatilization produced light scattering that interfered with the cadmium peak. The authenticity of the cadmium peak was checked by adding cadmium and then extracting it with an excess of ammonium pyrrolidine dithiocarbamate (APDC) and methyl isobutyl ketone (MIBK). Possible salt interferences were checked by a technique involving addition of cadmium, dilution, re-addition of cadmium and comparison of peak height. The direct injection technique agrees closely with an extraction method, yet allows greater sensitivity, simplicity and speed. (Jernigan-Vanderbilt)
W75-02084

THE APPLICATION OF ELECTRODEPOSITION TECHNIQUES TO FLAMELESS ATOMIC ABSORPTION SPECTROMETRY-PART I. THE DETERMINATION OF CADMIUM WITH A TUNGSTEN FILAMENT,
Oslo Univ. (Norway). Dept. of Chemistry.
W. Lund, and B. V. Larsen.
Analytica Chimica Acta, Vol 70, No 2, p 299-310, June, 1974. 13 fig, 1 tab, 14 ref.

Descriptors: *Cadmium, *Analytical techniques, *Electrolysis, Testing procedures, Laboratory tests, *Pollutant identification, *Spectrophotometry, Chemical analysis.

The use of controlled-potential electrolysis as a separation and preconcentration technique for metal wire flameless atomic absorption analysis was studied. The metal to be determined was electrolyzed onto a thin tungsten wire and then atomized by electrical heating of the filament in an inert atmosphere within an absorption cell. A detailed study of the effect of various experimental parameters on the determination of cadmium was presented. The effects of deposition potential, stirring of the solution, deposition time, filament position, inert-gas flow rate, and filament voltage and temperature were discussed. The detection limit was 0.1 ppb cadmium for a 2-min electrolysis period. The absolute detection limit was 4 x 10 to the minus 11th g. The method appeared to be well suited for the determination of cadmium in samples with a complex matrix. (Jernigan-Vanderbilt)
W75-02085

NEUTRON ACTIVATION ANALYSIS MEASUREMENTS OF HG, SE AND ZN LEVELS IN ALBACORE AND DOLPHINS,
California Univ., Irvine.
V. P. Guinn, R. Kishore, T. R. Folsom, V. F. Hodge, and M. C. Sargent.
Transactions of the American Nuclear Society, Vol 15, p 68-69, 1972. 1 tab.

Descriptors: *Analytical techniques, *Mercury, *Selenium, *Zinc, *Marine animals, *Distribution, Metals, Spectroscopy, Fish, Mammals, Neutron activation analysis, *Pollution identification.

This study, as a part of the Baseline Study of the International Decade of Ocean Exploration, has been concentrated on instrumental thermal-neutron activation analysis measurements of Hg, Se, and Zn in various tissues of the albacore and dolphin, employing nuclear reactor irradiations and Ge (Li) multi-channel gamma-ray spectrometry. The degree of concentration of each of the elements in each tissue studied relative to the level in dry flesh is cited; only those whose concentration is less than or equal to five times the dry flesh weight level are discussed. The only tissue in the albacore in which Hg concentrates heavily is the gills (6.8); Se concentrates in the albacore brain (13), heart (15), gills (23), kidneys (26), liver (35), and spleen (67); and Zn concentrates heavily in the liver (5.5), spleen (29) and kidneys (30). In the dolphins studied, the only tissue in which Hg was found to concentrate appreciably was the liver (8.5); Se concentrated in the dolphin spleen (5.8), blood (7.3), lungs (7.9) liver (9.6) and kidneys (9.7); and Zn concentrated appreciably in the dolphin kidneys (5.5), and liver (7.2). (Jernigan-Vanderbilt)
W75-02086

ATOMIC ABSORPTION SPECTROSCOPY-STAGNANT OR PREGNANT,
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Chemical Physics.
For primary bibliographic entry see Field 2K.
W75-02087

LEAD AEROSOL POLLUTION IN THE HIGH SIERRA OVERRIDES NATURAL MECHANISMS WHICH EXCLUDE LEAD FROM A FOOD CHAIN,
Aoyama-Gakuin Univ., Tokyo (Japan). Coll. of Science and Engineering.
Y. Hirao, and C. C. Patterson.
Science, Vol 184, No 4140, p 989-992, May 31, 1974. 2 tab, 10 ref.

Descriptors: *Lead, *Air pollution, *Food chains, *Rodents, On-site data collections, On-site investigations, Testing procedures, Plants, Analytical techniques, Rural areas, Pollutant identification.
Identifiers: *High Sierra(Thompson Canyon).

The common assumption that natural concentrations of lead exist within plants and animals in open country was investigated. Conclusions were based on measurements of lead inputs and outputs for a natural ecosystem, and on measurements of the distribution of lead within a food chain within the ecosystem. The studies were carried out in Thompson Canyon in the crest of the High Sierra. About 97% of the aerosol lead entering Thompson Canyon is, on the basis of Pb/(K+Ca) rations, of industrial origin. The difference between lead input and lead output showed that, at present, about 98% of the industrial lead entering the valley as aerosols remains there. Measurements indicated that at least 80% of the lead ingested by meadow voles (mountain meadow mice) in Thompson Canyon collects on leaf surfaces by aerosol deposition and originates from lead mines. Multiplicative natural purification processes exclude lead from the upper end of the vole food chain, indicating that it is possible for those small amounts of industrial lead that circumvent natural purification processes to seriously pollute higher organisms. Until a careful mass balance is performed, flora and fauna, even in remote areas, must be suspected of serious lead pollution. (Jernigan-Vanderbilt)
W75-02088

ANALYSIS FOR CHROMIUM TRACES IN NATURAL WATERS-PART I. PRECONCENTRATION OF CHROMATE FROM P.P.B. LEVELS IN AQUEOUS SOLUTIONS BY ION EXCHANGE,
California Inst. of Tech., Pasadena. Dept. of Environmental Engineering Sciences.
J. F. Pankow, and G. E. Janauer.
Analytica Chimica Acta, Vol 69, No 1, p 97-104, March, 1974. 4 fig, 1 tab, 14 ref.

Descriptors: *Chromium, *Trace elements, *Analytical techniques, *Aqueous solutions, *Ion exchange, Water, Public health, Pollutants, Food chain, Algae, *Pollutant identification.

A convenient, simple, and very efficient procedure for the concentration of chromate from aqueous solution by ion exchange was described. Water samples containing chromate were acidified to pH5 and passed through air anion-exchange resin bed in ascending flow, so that the chromate was adsorbed in a narrow zone at the lower end of the resin bed. The chromate was eluted rapidly with small volumes of an acidic reductant solution which reacted with chromate on the column to form chromium (III) during the actual elution step, thus producing very high concentration factors. (Jernigan-Vanderbilt)
W75-02101

THE DETERMINATION OF ORGANIC HALOGENOMERCURY COMPOUNDS BY TITRATION OF HALIDE,
College de France, Paris. Laboratoire de Biochimie Cellulaire.
M. Olomucki, and G. Roure.
Analytica Chimica Acta, Vol 70, No 2, p 478-481, June, 1974. 1 tab, 7 ref. Delegation Generale a la Recherche, Scientifique et Technique (72.7.0736).

Descriptors: *Mercury, *Volumetric analysis, *Organic compounds, *Halides, Ions, Laboratory tests, Solvents, Aqueous solutions, Analytical techniques, Metal organic pesticides, *Pollutant identification.

A rapid and precise titrimetric method for the determination of organic halogenomercury derivatives was described. The compound to be analyzed was first treated with a hydrophobic thiol (octanethiol). The halogen, in a purely ionic form, and the organic derivative (containing the interfering mercury atom) thus formed could then be separated by partition between water and an organic solvent (usually ethyl acetate); the halide could be conveniently determined in the aqueous phase by Volhard titration. In the case of aliphatic derivatives, the addition of sodium hydroxide with the thiol gave much higher recoveries. No interference was observed when the halogenomercurials contained another halogen atom in a haloalkyl group. (Jernigan-Vanderbilt)
W75-02105

MEASUREMENT OF MERCURY IN HUMAN HAIR,
Rochester Univ., N.Y. Dept. of Radiation Biology and Biophysics.
T. Giovanoli-Jakubczak, and G. C. Berg.
Archives of Environmental Health, Vol 28, No 3, p 139-144, March 1974. 5 fig, 1 tab, 15 ref. NSF(GI-300978).

Descriptors: *Distribution, *Mercury, *Human physiology, *Sampling, *Model studies, Heavy metals, Inorganic compounds, Organic compounds, Computer models, Sampling, Trace elements, Analytical techniques, Public health, Toxicity, Human pathology, *Pollutant identification.

Measurements of total and inorganic mercury in human hair were used to trace the history and extent of methyl mercury exposures. Data on the distribution of mercury in hair were converted by a mathematical model into information about the key indices of exposure, including times of onset and termination, peak concentration in hair, and half-time of retention in blood. The model was used for computer simulations of the true distribution of mercury in hair and was validated by analyses of segments of single hairs. Conventional methods of hair sampling and fitting the resulting data to a curve were shown to introduce systematic errors underestimating peak concentrations and overestimating retention times. These errors were minimized by practical modification of the hair sampling procedures and by a new graphic method for deriving the measurements of distribution of the trace element in hair. (Jernigan-Vanderbilt)
W75-02111

ACCURATE DETERMINATION OF COPPER IN MIXTURES AND ORES BY RADIOISOTOPE-

EXCITED X-RAY FLUORESCENCE SPECTROMETRIC ANALYSIS USING PEAK RATIOS,
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Centre.
For primary bibliographic entry see Field 2K.
W75-02113

RECENT DEVELOPMENTS IN THE ANALYSIS OF TOXIC ELEMENTS,
Cornell Univ., Ithaca, N.Y. Pesticide Residue Lab.
D. J. Lisk.
Science, Vol 184, No 4142, p 1137-1141, June, 1974. 1 tab, 182 ref.

Descriptors: *Analytical techniques, *Trace elements, *Reviews, *Heavy metals, Spectroscopy, Arsenic compounds, Beryllium, Cadmium, Chromium, Cobalt, Copper, Gold, Lead, Manganese, Mercury, Molybdenum, Nickel, Silver, Strontium, Tin, Zinc, Chromatography, *Pollutant identification.

A survey of some recent analytical advances and their practical applications to biological problems was given. Advances in sampling, ashing, element isolation, and concentration are described. The analytical techniques discussed were: atomic absorption, anodic stripping voltammetry, colorimetry, emission spectrometry, fluorescence analysis, gas-liquid chromatography, neutron activation analysis, and polarography. A list of elements and the analytical techniques applicable to each element was given. (Jernigan-Vanderbilt)
W75-02114

PRELIMINARY STUDY ON THE DISTRIBUTION AND EFFECTS OF TWO CHEMICAL FORMS OF METHYL MERCURY IN PIKE AND RAINBOW TROUT,
Helsinki Univ. (Finland). Dept. of Radiochemistry.
For primary bibliographic entry see Field 5C.
W75-02115

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, CENTRAL REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-02116

AN INSTRUMENT FOR THE MEASUREMENT OF FIBRE IN EFFLUENT,
Australian Paper Manufacturers Ltd., Melbourne (Australia).
D. J. Williams.
Appita (Journal of the Technical Association of the Australian and New Zealand Pulp and Paper Industry) Vol 28, No 2, p 99-103, September 1974. 8 fig.

Descriptors: *Pulp wastes, *Fibres(Plant), *Instrumentation, Bleaching wastes, Pulp and paper industry, *Effluents, Industrial wastes, Measurement, Control systems, *Pollutant identification.

An instrument has been developed for recording the concentration of fibre is effluent to assist in meeting specifications for effluent fibre concentration and to reduce fibre loss from recovery systems generally. It is applicable to effluents differing widely in colour and carrying variable concentrations of other suspended solids such as clay and titanium dioxide. Fibre concentration is measured by the pulsating pressure drop developed across a self cleaning circular screen rotating in a stream of effluent. A prototype unit with a range of 0 to 100 ppm has been operating successfully for eight months on bleach plant effluent. The range may be extended to at least 300 ppm with different types of screen. A second unit is operating on trial on the clear filtrate of a disc filter in a paper machine backwater system. (CSIRO)
W75-02166

RENAL AND SKELETAL LESIONS IN EXPERIMENTAL CADMIUM POISONING,
Kyoto Univ. (Japan). Dept. of Hygiene.
For primary bibliographic entry see Field 5C.
W75-02192

ARSENIC IN BLOOD AND URINE OF FOREST WORKERS,
Oregon State Univ., Corvallis. Environmental Health Sciences Center.
S. L. Wagner, and P. Weswig.
Archives of Environmental Health, Vol 28, No 2, p 77-79, February, 1974. 2 tab, 7 ref. PHS (ES-00210).

Descriptors: *Arsenic compounds, *Human physiology, *Organic compounds, Toxicity, Public health, Data collections, Analytical techniques, *Pollutant identification, Chemical analysis.

Five healthy forest workers exposed to cacodylic acid during a two-month period were observed for evidence of accumulation of arsenic in the blood, the pattern of its urinary excretion, and signs of clinical toxicity. Urinary arsenic appeared to constitute an index of exposure, with excretion levels increasing within one week. Blood levels were found to correlate poorly with exposure. Worker education and proper safety precautions in clothing must be emphasized. Arsine gas in treated forest areas may be potentially dangerous to forest workers. (Jernigan-Vanderbilt)
W75-02193

STUDY OF THE APPLICATION OF ATOMIC FLUORESCENCE SPECTROMETRY TO THE DIRECT DETERMINATION OF MERCURY AND CADMIUM IN THE ATMOSPHERE,
Louisiana State Univ., Baton Rouge. Dept. of Chemistry.
J. W. Robinson, and Y. E. Araktingi.
Analytical Chimica Acta, Vol 63, No 1, p 29-38, January, 1973. 5 fig, 6 tab, 25 ref.

Descriptors: *Analytical techniques, *Air pollution, *Mercury, *Cadmium, *Fluorescence, Laboratory tests, Testing procedures, *Pollutant identification, Atmosphere, *Spectrophotometry, Chemical analysis.

An attempt was made to use atomic fluorescence as a technique for the direct determination of mercury and cadmium in the ambient atmosphere. A hot carbon bed was used for the reduction of metals to free atoms. Results showed that carbon monoxide formed in the bed acted as a severe quenching agent and that nitrogen also was a quenching agent, although less severe. This changed the sensitivity of the technique to concentration levels above that normally encountered for these metals in air. The technique was unsuitable for the direct determination of metals in air. (Jernigan-Vanderbilt)
W75-02196

DETERMINATION OF ELEMENTAL MERCURY IN AN EMISSION SOURCE HAVING A HIGH SULFUR DIOXIDE CONCENTRATION BY AMALGAMATION WITH GOLD AND ULTRAVIOLET SPECTROPHOTOMETRY,
TraDet Labs., Inc., Columbus, Ohio.
C. M. Baldeck, G. W. Kalb, and H. L. Crist.
Analytical Chemistry, Vol 46, No 11, p 1500-1505, September, 1974. 6 fig, 2 tab, 20 ref.

Descriptors: *Mercury, *Gold, *Analytical techniques, *Separation techniques, Absorption, Sampling, *Spectrophotometry, *Pollutant identification, Chemical analysis.

The use of gold as a collection medium for the quantitative separation of elemental mercury from stack gases in the presence of 6-8% SO2 was described. A slightly modiefied Environmental Protection Agency sampling train with the impingers altered to hold 20-30 grams of gold chips was used. The gold amalgam was heated in an induction coil and the liberated mercury was absorbed in 3% KMn04 solution. Particulates on the filter were digested in HN03. Both solutions were reduced, aerated, and the absorbance was measured at 253.7 nm by an ultraviolet spectrophotometer. Collection of mercury on gold eliminated several interferences such as SO2, H2S, and organic substances which may be present in stack gases and react with liquid absorbing reagents inhibiting their quantitative retention of mercury. The collection efficiency of the filter and amalgamators was, for most runs, in excess of 95%. The retention of mercury on three gold amalgamators between the sampling rates of 0.3 and 0.7 cubic feet per minute was well above 95% at sampling times of 5, 10, and 15 minutes. (Jernigan-Vanderbilt)
W75-02199

ADSORPTION OF HG(II) BY FERRIC HYDROXIDE,
University of Southern California, Los Angeles. Environmental Engineering Program.
For primary bibliographic entry see Field 5B.
W75-02200

5B. Sources Of Pollution

AVAILABILITY OF MAGNESIUM: BALANCE STUDIES IN RATS WITH VARIOUS INORGANIC MAGNESIUM SALTS,
Mead Johnson Research Center, Evansville, Ind. Dept. of Nutritional Research.
For primary bibliographic entry see Field 5C.
W75-01667

QUANTITATIVE RECOVERY OF TRACE AMOUNTS OF CYANIDE IN SURFACE WATERS USING A MODIFIED SERFASS DISTILLATION PROCEDURE,
Industrial BIO-Test Lab., Northbrook, Ill. Environmental Sciences Div.
T. . Bowling, W. D. Sheehan, and J. J. Delfino.
Environmental Letters, Vol 6, No 1, p 25-29, 1974. 1 tab, 7 ref.

Descriptors: *Cyanide, *Analytical techniques, *Colorimetry, *Surface waters, Toxins, Trace elements, Laboratory tests, *Distillation.

The Serfass distillation method developed to measure cyanide in metal plating wastes solutions has been found unsuitable for surface water samples because of the difficulty of obtaining reproducible cyanide recoveries at low levels. Poor recoveries below 0.1 mg/l and large standard deviations have been reported. A procedure is discussed that is a modification of the Serfass distillation using an absorption column. The result of the distillation procedure is an interference-free solution that is suitable for the colorimetric determination cyanide. The procedure utilizes the pyridine-pyrazolone colorimetric test and possesses a limit of detection on distilled water standards of 0.005 mg/l with coefficients of variation ranging from 3 to 14% for three different surface waters investigated. Water samples were obtained from an enriched surface water, a typical river system, and a typical lake system and spiked with known amounts of cyanide. Recoveries approximately 5 to 6 times greater than those with the serfass procedures were obtained. (Jernigan-Vanderbilt)
W75-01672

IDENTIFICATION AND BIOTRANSFORMATION OF ORGANOMERCURIAL COMPOUNDS

IN LIVING SYSTEMS, A REVIEW OF CURRENT UNDERSTANDING,
Health and Welfare Canada, Ottawa (Ontario). Health Protection Branch.
G. A. Neville, and M. Berlin.
Environmental Research, Vol 7, No 1, p 75-82, February, 1974. 46 ref.

Descriptors: *Metabolism, *Mercury, *Organic compounds, *Reviews, Aquatic life, Toxicity, Inorganic compounds, Public health, Research and development, Plants, Animals.
Identifiers: *Methylmercury.

The chemical basis for mercurial toxicity in various living systems is the overall concern of this review. Biotransformation of organomercurial forms of special concern to environmentalists, and structural evidence for derived mercurial moieties is discussed in the perspective of evolving understanding of biotransformation and methodological development. Mercurial forms discussed include methylmercury, ethylmercury, methoxyethylmercury salts, phenylmercuric salts and dimethylmercury. Identification of the mercurial forms in tissues, body fluids, and cellular bodies remains a necessary, but challenging, key to the understanding of mercurial toxicology. (Jernigan-Vanderbilt)
W75-01673

PLANTS AS BIOINDICATORS OF THE CONTAMINATION OF A WATERWAY BY EFFLUENTS OF A NUCLEAR POWER STATION: ASSESSMENT OF RADIOACTIVE RELEASE OF A REACTOR (CHOOZ, FRENCH ARDENNES REGION) THROUGH AQUATIC AND RIPARIAN PLANTS OF THE RIVER MEUSE, (IN FRENCH),
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
R. Kirchmann, and J. Lambinon.
Bull Soc R Bot Belg. Vol 106, No 2, p 187-201, 1973, Illus. English summary.
Identifiers: *Aquatic plants, *Bioindicators, Cinclidotus danubicus, Effluents, *France(River Meuse), Helophytes, Mosses, Nuclear power plants, Pollution, Radiation, Radioactive wastes, Reactors, Riparian, Rivers, Waterways.

In outlining a general program of environmental surveillance around nuclear power stations, several aquatic and ripicolous plants were checked as possible bioindicators of water contamination and of its variations in the course of time. A comparison of different plant species emphasized the difficulties in using helophytes; it led to the choice of aquatic mosses, particularly Cinclidotus danubicus, as biological indicators. Response of this species at a point situated at about 15 km downstream of the nuclear power station was analyzed during a period larger than 3 yr. The contamination levels of this indicator at some points of the river Meuse were compared at an interval of 2 yr; results are discussed, especially in connection with the activity levels of the releases.--Copyright, 1974, Biological Abstracts, Inc.
W75-01675

METALS: PARTS AND THE WHOLE,
Environmental Protection Agency, Cincinnati, Ohio.
A. W. Breidenbach.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio, National Environmental Research Center, Cincinnati, Ohio, p 1-2, February, 1973.

Descriptors: *Heavy metals, *Trace elements, *Public health, *Water pollution, Water quality control, Conferences, Solid wastes, Research and development.

A general overview of metals and their effect on man and the earth is presented. While research which is confined to a narrow avenue can produce sound, usable data, a holistic view of the environment is needed to make true progress. Air, water, solid waste, pesticide, radiation, noise, etc. cannot be considered independently of one another. The interrelationships between various environmental segments must receive paramount consideration, not only at the level of the research administrator but also by the scientists who conduct research and exchange information. The researchers, must develop a stewardship in the use of resources that avoids the difficulties of high and low exposures to life forms and encourages reclamation, re-use, and recycling for the ultimate benefit of future generations. (See also W74-09206)
W75-01676

THE SEASONAL VARIATION OF THE NUMBER OF MICROORGANISMS IN TWO PSEUDOGLEY-SOILS WITH DIFFERENT WATER CONTENTS, (IN GERMAN),
Bonn Univ. (West Germany). Institut fuer Bodenkunde.
G. Franz.
Pedobiologia, Vol 13, No 5, p 376-383, 1973. English summary.
Identifiers: *Aerobic bacteria, *Anaerobic, *Microorganisms, *Pseudogley soils, *Seasonal, Soils, Waterlogging.

Waterlogging as well as desiccation of the soil were followed by a decrease of the numbers of aerobic bacteria. Extent and duration of this decrease differed in both soils and also in the various horizons of both soils. The relation of the numbers of aerobic to anaerobic bacteria showed seasonal variations and was lowest during the wet phase. The pseudogley with the longer wet phase was characterized by more anaerobic conditions than the drier site.--Copyright 1974, Biological Abstracts, Inc.
W75-01678

OVERVIEW OF EFFECTS OF TRACE METALS,
Illinois Univ., Urbana.
For primary bibliographic entry see Field 5C.
W75-01679

EFFECTS AND DEVELOPMENT OF CRITERIA AND THE ESTABLISHMENT OF STANDARDS,
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5C.
W75-01682

EFFECTS AND ESTABLISHMENT OF CRITERIA,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 5F.
W75-01683

HUMAN STUDIES LABORATORY,
Environmental Protection Agency, Research Triangle Park, N.C.
For primary bibliographic entry see Field 5C.
W75-01684

SIGNIFICANT EFFECT OF POLLUTANTS,
International Lead Zinc Research Organization, Inc., New York.
For primary bibliographic entry see Field 5C.
W75-01685

STATEMENT ON ESTABLISHMENT OF CRITERIA FOR METALS IN FOODS,
Department of Health, Education and Welfare, Washington, D.C.
For primary bibliographic entry see Field 5C.
W75-01686

BIOMEDICAL RESEARCH IN SUPPORT OF CRITERIA AND STANDARDS,
National Inst. of Environmental Health Sciences, Research Triangle Park, N.C.
For primary bibliographic entry see Field 5C.
W75-01687

CHANGES IN THE MYCOFLORAS OF PASTURE SOILS AFTER LONG-TERM IRRIGATION,
Department of Scientific and Industrial Research, Wellington (New Zealand). Information Services.
For primary bibliographic entry see Field 3F.
W75-01689

MIXING OF MERGING BUOYANT JETS FROM A MANIFOLD IN STAGNANT RECEIVING WATER OF UNIFORM DENSITY,
P. Liseth.
Vatten, Vol 29, No 4, p 367-381, 1973, Illus.
Identifiers: Buoyant jets, Density, *Jets, *Mixing, Oceans, Stagnant water, Waste disposal, Water pollution, Estuaries.

Submerged manifolds (diffusors) are commonly used for waste water disposal into estuaries and the ocean. The mixing of buoyant jets from a long manifold discharging into stagnant receiving water of uniform density was studied in hydraulic model experiments. The manifold consisted of a pipe with round ports along both sides, issuing jets horizontally from the ports. The initial mixing of merging jets from a manifold was described. This study should provide a basis for design of a manifold with respect to port spacing size and discharge velocity of the jets.--Copyright 1974, Biological Abstracts, Inc.
W75-01690

CONTROL OF PARTICULATE LEAD EMISSIONS FROM AUTOMOBILES,
Du Pont de Nemours (E. I.) and Co., Wilmington, Del.
E. N. Cantwell, E. S. Jacobs, W. G. Kunz, Jr., and V. E. Liberi.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 95-107, February, 1973. 16 fig, 10 tab, 11 ref.

Descriptors: *Lead, *Air pollution, *Gasoline, Heavy metals, Pollutants, Public health, Toxicity, Control, Conferences.
Identifiers: Automobiles.

Although the EPA has recently passed regulations to eliminate some or all of the lead from gasoline, an alternate approach is offered for control regulations based on tail pipe emissions. Exhaust particulate lead traps used on cars burning leaded gasoline have demonstrated the ability to significantly reduce motor vehicle lead emissions. Brief descriptions of exhaust particulate trap systems are included along with new data on the total lead removal efficiency of lead traps for different size lead particles, and airborne lead emissions from production and trap-equipped cars driven on the road in an unused Pennsylvania Turnpike tunnel. The development and performance of a new type of lead trap, designed to replace the exhaust muffler of cars, lst the life of the vehicle, and reduce the airborne lead emissions from cars by greater than 65% were presented. Laboratory measurements of exhaust particulate emissions showed even greater potential reductions of lead emissions with use of particulate traps. (See also W74-09206)
W75-01691

TRACE ELEMENT EMISSIONS FROM THE COMBUSTION OF FOSSIL FUELS,
Commonwealth Edison Co., Chicago, Ill.
J. R. Fancher.

In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio, National Environmental Research Center, Cincinnati, Ohio, p 109-113, February, 1973. 1 fig, 3 tab, 8 ref.

Descriptors: *Trace elements, *Fossil fuels, *Burning, *Air pollution, Coal, Oil, Heavy metals, Pollutants, Pollution abatement, Mechanical control, Chemical precipitation, Public health,

Combustion of fossil fuels especially in electric utility furnaces constitutes a large source of trace element emissions. Oils and coals are the main offenders, because natural gas, also one of the fossil fuels, contains virtually no trace elements. Four types of pollution control equipment in use or under construction for utilities are mechanical collectors, electrostatic precipitators, baghouses, and scrubbers. All of these devices are aimed principally at reducing the emissions of particulates; therefore, they are generally effective if the material to be collected is in a condensed or combined form as it passes through the control equipment. Characteristics of each type of control equipment are discussed. Conclusions are: (1) trace element emissions from combustion systems cannot yet be readily quantified. (2) the effects of current levels of airborne trace elements on health and welfare are not yet known, but there is little evidence of critical association and essentially none of causation. (See also W74-09206)
W75-01692

MICROBIOLOGICAL AND ENZYMIC ACTIVITY OF DRAINED PEAT SOILS UNDER PINE STANDS, (IN RUSSIAN),
Belourssкii Tekhnologicheskii Institut, Minsk (USSR). Dept. of Soil Science Geology.
I. K. Blintsov, and V. A. Ipat'ev.
Biol Nauki, Vol 16, No 10, p 119-123, 1973.
Identifiers: Actinomycetes, Drained soils, *Enzymic activity, Invertase, Microbiological studies, Molds, *Peat soils, *Pine stands, Protease.

In reclaimed peat soil there is a direct relation between the water regime, quantitative composition of ammonifying organisms, actinomycetes, molds and enzymatic activity (Protease, invertase). Intensification of microbiological and enzymic activity increases the height and the total productivity of the stands.--Copyright 1974, Biological Abstracts, Inc.
W75-01695

MONITORING FOR TRACE METALS IN FOOD,
Department of Health, Education and Welfare, Washington, D.C.
For primary bibliographic entry see Field 5A.
W75-01696

ECONOMIC AND LEGAL ASPECTS,
Battelle Columbus Labs., Ohio.
G. Strasser.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 167-168, February, 1973.

Descriptors: *Economic impact, *Legal aspects, *Heavy metals, *Pollution, Conferences, Social aspects, Environmental control, Industrial wastes.

What is being talked about when discussing problems of the environment is an internalization of external costs; the point has been reached where there is too much concern about this balance. Since much of what gets done today gets done with a de facto understanding of cost externalization, the real question that faces those who are concerned with the environment is not whether or not something has to be done about the situation. The question is how to protect the environment without creating economic and social disruptions. Considering the long time that people and agencies have tried to answer this question without success it seems imperative to systematize attempts at protecting the environment. Modern technology makes it possible to achieve more, but also the make larger mistakes if the wrong decision is made. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01698

HOW MUCH RECYCLING IS ENOUGH,
Resources for the Future, Inc., Washington, D.C.
For primary bibliographic entry see Field 6G.
W75-01699

LAW AND TRACE METALS,
Ohio State Univ., Columbus.
E. F. Murphy.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference , October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 179-187, February, 1973. 62 ref.

Descriptors: *Trace elements, *Legal aspects, *Heavy metals, Lead, Mercury, Copper, Zinc, Chromium, Beryllium, Iron, Cadmium, Vanadium, Nickel, Asbestos, Economic impact.

The metals discussed are lead, mercury, copper, zinc, berryllium, chrome, iron, cadmium, vanadium, nickel, and while not commonly considered a metal, asbestos. Some of their side effects have long been known but only in recent ages have the dangers been commonly recognized. Today there exist both federal and state laws on industrial hygiene, workers' health and safety, workmen's compensation, and air and water pollution control that, directly or indirectly, are profoundly concerned with the consequences of trace metals in the environment as a result of economic activity. Some laws are of recent enactment, particularly at the federal level, and others are sufficiently old to have accumulated a large body of case law. The legal aspects and problems of lead, mercury, asbestos, beryllium, and also lesser trace metals are discussed. In any comments on trace metals and the law, there is an interlocking of workmen's compensation, industrial hygiene, and environmental protection that are very difficult to coordinate. Probably, from the lawyer's viewpoint, the subject of trace metals, or even trace substances, is one that is insufficiently legalistic in its conceptualization; and for lawyers such terms as negligence, resonable risk, etc. would be easier to deal with. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01700

EFFECT OF EVAPORATION DEPRESSORS ON SOIL MICROFLORA, (IN UKRANIAN).
Kiev State Univ. (USSR).
For primary bibliographic entry see Field 2D.
W75-01724

FIELD STUDY OF THE FLOW PROCESSES IN A POROUS AQUIFER BY MEANS OF TRACER DYES (FELDUNTERSUCHUNGEN VON FLIESSVORGAENGEN IN EINEM PORENGRUNDWASSERLEITER MITTELS FARBSTOFFINDIKATOREN),
Heidelberg Univ. (West Germany). Physikalisches Institut (II).
For primary bibliographic entry see Field 2F.
W75-01740

THE SOLUBILITY PRODUCT OF FERROUS PHOSPHATE,
Rutgers-The State Univ., New Brunswick, N.J. Dept. of Environmental Sciences.
P.-J. Chen, and S. D. Faust.
Environmental Letters, Vol 6, No 4, p 287-296, 1974. 3 fig, 2 tab, 5 ref.

Descriptors: *Chemical precipitation, *Laboratory tests, *Phosphates, *Iron, *Solubility, Free energy, Waste water treatment, Ions, *Free energy.

Experimentation on the chemical precipitation of phosphate using ferrous iron indicates that the solubility product constant of ferrous phosphate can be measured as 1.07 x 10 to the minus of 29th power at 0.1 M ionic strength and 25C. The free energy of the dissolution reaction of ferrous phosphate was calculated as 39.8 Kcal/mole; the free energy of formation of ferrous phosphate was computed as -590.0 Kcal/mole. (Sandoski-FIRL)
W75-01755

MEASUREMENT OF THE ALLUVIAL DEPOSIT TRANSPORT BY MEANS OF RADIOACTIVE TRACERS (MESSUNG DES FLUSSSEDIMENT-TRANSPORTES MIT HILFE RADIOACTIVER MARKIERUNG),
Technical Univ. of Budapest (Hungary). Dept. of Water Economy.
Z. Erdelysky.
Oesterreichische Wasserwirtschaft, Vol 26, No 3/4. p 89-92, March-April, 1974. 6 fig.

Descriptors: *Alluvium, *Radioactive tracers, Radioisotopes, Analytical techniques, Flow rates.
Identifiers: *Alluvial deposits, *Danube River.

The propagation of alluvial deposit of different particle sizes in Danube river was studied by radioactive tracers. Four different radioactive isotopes with characteristic gamma-components and intensities (Zn-65, Zr-95, Hf-181 and Sb-124) were embedded in pebbles of different sizes and sealed by araldit resin. The pebbles were laid in the river and their propagation was followed up by systematic scanning of the riverbed by means of scintillation detectors. The pebbles were found to be carried away by the water stream in a narrow strip of 2.5 m in width, maintained even after a path of 1,600-2,000 m. At a flow rate of 0.75 m/sec measured near the riverbed, a 3 mm-particle had a velocity of 0.21 m/sec. (Takacs-FIRL)
W75-01767

STREET RUNOFF AS A SOURCE OF LEAD POLLUTION,
Oklahoma State Dept. of Health, Oklahoma City. Water Quality Control Service.
C. D. Newton, W. W. Shepard, and M. S. Coleman.
Journal Water Pollution Control Federation, Vol 46, No 5, p 999-1000, May, 1974. 4 ref.

Descriptors: *Lead, *Urban runoff, *Surface runoff, *Water pollution sources, *Oklahoma, Water pollution, Spectrophotometry, Analytical techniques, *Path of pollutants.
Identifiers: Automobile emissions, Roadbeds, *North Canadian River(Okla).

In 1972, a surface water survey conducted by the Oklahoma State Department of Health indicated excessive amounts of lead in the upper portions of the Deep Fork branch of the North Canadian River in Oklahoma County. No point source could be located for this contamination until a recent report (1973) showed that lead from automobile emissions accumulates on the surface of streets during dry periods and is washed into surface waters during storm runoff. Automobile emissions deposit large amounts of lead close to the source primarily on or near the roadbed. Samples of snow, ice, and water were taken from several sites along heavily traveled highways and analyzed for lead content by use of an atomic absorption spectrophotometer. Average concentration of lead in samples from road bed edges was 5.5 mg/liter (range 3.6-8.5 mg/liter). Concentrations of lead decreased in samples as distance from the roadbed increased. The lowest concentration was found in the middle of an open field surrounded on three sides by heavily traveled roads. The lead level was 0.09 mg/liter. (Shaffer-FIRL)

W75-01770

POWER, PLANKTON, AND FIREFLY TAILS,
National Marine Water Quality Lab., West Kingston, R.I.
J. C. Prager, C. S. Hegre, S. Cheer, P. Rogerson, and J. H. Gentile.
Underwater Naturalist, Vol 8, No 1, p 18-22, June 1973. 3 photo.

Descriptors: *Estuaries, *Coasts, *Water quality, *Water quality standards, *Eutrophication, Aquatic animals, Ecosystem, Biomass, Plankton, Nitrogen, Algae, Water environment, Food chains, Microorganisms, Aquatic microbiology, Water pollution, *Florida.
Identifiers: *Adenosine triphosphate, Biscayne Bay(Fla).

Microscopic plants, the base of the marine food chain, exist in great diversity in healthy bays and estuaries, but in polluted waters a few nuisance species bloom to the detriment of the marine environment. Requirements and tolerances of these microalgae must be determined so that legislated water quality standards account for the needs of all members of the ecosystem. A procedure has been developed to evaluate the condition of microscopic plants (and animals) in nearshore marine life. The measurement of adenosine triphosphate (ATP) can determine the living biomass in a volume of water, because although a living cell maintains a relatively constant ATP level, a freshly killed cell loses its ATP in seconds. This procedure was employed to show that a power plant in Biscayne Bay, Florida was destroying eighty-five percent of the zooplankton and half of the microscopic algae in the water it used for cooling purposes. Since the time required for transportation of the marine samples would spoil the ATP analyses, liquid nitrogen was used to freeze and fix the samples instantly. ATP analysis is now the fastest chemical assessment of plankton condition. (Ritchie-Florida)
W75-01795

OCEAN WASTE DISPOSAL: A VIOLATION OF THE PUBLIC TRUST DOCTRINE,
Duquesne Univ., Pittsburgh, Pa. School of Law.
E. J. Linky.
Underwater Naturalist, Vol 7, No 4, p 30-35, November 1972. 1 map, 4 photo.

Descriptors: Sewage, Sewage disposal, Legal aspects, Oceans, Waste, Waste disposal, Fisheries, Water, Water pollution, Coasts, Public rights, Water law, Governments.
Identifiers: Public trust doctrine, Coastal waters.

The public trust doctrine may be a valuable legal tool for halting some types of pollution such as waste disposal in offshore areas. The doctrine has its roots in English common law, and is based on the theory that the Sovereign had in his domain certain lands or property interests so vital to the common good that alienation of these interests to private individuals would violate a public trust. The doctrine is available to anyone, and this feature makes the doctrine even more expedient in the light of a recent Supreme Court decision which has muddled the question of standing for environmental groups. The New York Bight is one of the most grossly polluted harbor complexes in the country, endangering bathers and local fisheries. Waste disposal is accomplished by barging sludge, acids, cellar dirt and other toxic wastes to dump zones off the coasts of New York and New Jersey. The public trust doctrine could be used to protect this area since the United States has jurisdiction over the resources in the waters and soils of the disposal area. Authority exists to substantiate federal responsibility for the dump sites and the biological harm caused by the sludge, since a recent extension of the three mile boundary by a nine mile contiguous zone effectively establishes territorial waters at twelve miles. (Ritchie-Florida)
W75-01798

LIFE AND POLLUTION IN GREAT SOUTH BAY,
Offshore/Sea Development Corp., New York.
G. Claus.
Underwater Naturalist, Vol 7, No 1, p 11-16, 1971. 1 map, 1 photo.

Descriptors: *Water pollution, *Water pollution sources, *Phosphates, *Sewage, *Eutrophication, Water, Sewage disposal, Algae, Nutrients, Shellfish, Bays, Bogs, Environment, Sewage, Treatment, Oxygen, Environmental effects, Atlantic Ocean, New York.
Identifiers: *Great South Bay, Long Island(NY).

Increasing levels of pollution in coastal waters, estuaries and tributaries have had a dramatic effect on the natural animal and plant communities in these bodies of water. Great South Bay, on the southern shore of Long Island is an example of a salt bay with biological problems. The ecological difficulty stems from the presence of exceedingly high concentrations of phosphates in the waters which originate mostly from surface runoffs and inadequate sewage treatment facilities. A second contributing factor is the continuous seepage of highly enriched domestic waste from cesspools. This creates conditions which are favorable for the development of perpetual algal blooms. These plants eventually die, dissolve and add to the nutrient value of the water, favoring the growth of both plants and animals. As more organic matter is formed conditions for its removal and decomposition become less favorable. A point is reached at which the amount of oxygen required for the complete oxidation of the organic material will not be available either through surface aeration or through its liberation by photosynthesis. When this state is reached, the transformation of the bay into a bog begins, and these conditions are destroying Long Island's valuable shellfish industry. (Ritchie-Florida)
W75-01799

GEOLOGIC AND HYDROLOGIC CONTROL OF CHLORIDE CONTAMINATION IN AQUIFERS AT BRUNSWICK, GLYNN COUNTY, GEORGIA,
Geological Survey, Washington, D.C.
D. O. Gregg, and E. A. Zimmerman.
Available from Sup Doc, GPO, Washington, D.C. 20402. Price $2.80. Water-Supply Paper 2029-D, 1974. 44 p, 10 fig, 6 plate, 8 tab, 8 ref.

Descriptors: *Water pollution sources, *Path of pollutants, *Georgia, *Saline water intrusion, *Withdrawal, Water pollution control, Saline water, Artesian aquifers, Hydrogeology, Hydrology, Geology.
Identifiers: *Brunswick(Ga), *Glynn County(Ga).

Water from a brackish-water zone (1,050-1,350 ft) under Brunswick, Georgia, has concentrations as high as 2,150 milligrams per liter chloride, and concentrations are suspected to be higher than 3,000 mg/liter chloride. This brackish water is the source of the water that contaminates the upper and lower freshwater-bearing zones of the principal artesian aquifer. The confining unit separating the fresh and brackish water contains breaks that act as vertical conduits for the movement of brackish water into the freshwater zones of the aquifer. The rate of upward movement of brackish water is a function of the rate of water-level decline in the aquifer. In a few areas, where individual wells have been drilled deep enough to penetrate the confining unit over the brackish-water zone, the well furnishes a conduit for brackish water to recharge the freshwater aquifer. Plugging the lower part of these wells usually reduces the chloride concentration of the water. The chloride concentration of water in the principal artesian aquifer can probably be reduced by use of interceptor wells, relief wells, or well-field spacing. Interceptor wells would prevent laterally moving brackish water from contaminating a well field. A relief well would tap and withdraw poor quality water from only the brackish-water zone to lower the head in that zone and decrease the rate of leakage into the freshwater aquifer. Wider spacing of wells would prevent the development of a deep cone of depression and the steeper hydraulic gradients that accompany it. (Knapp-USGS)
W75-01816

WASTEWATER DISCHARGES INTO PENSACOLA BAY, ESCAMBIA BAY AND RIVER (EXCLUDING MONSANTO, AMERICAN CYANAMID AND AIR PRODUCTS),
Environmental Protection Agency, Athens, Ga. Surveillance and Analysis Div.
J. S. Hall.
Available from NTIS, Springfield, Va 22161 as PB-228 285, $3.75 PC, $2.25 MF. Environmental Protection Agency Report, May 1972. 31 p, 6 ref, 4 fig, 5 tab. (Report to the Conferees of the Third Session of the Conference in the Matter of Pollution of the Interstate Waters of the Escambia River Basin (Ala-Fla) and the Intrastate Portions of the Escambia Basin Within the State of Florida).

Descriptors: *Waste Water(Pollution), *Industrial Wastes, *Municipal Wastes, *Water Quality, Waste Water Disposal, Hydrogen Ion Concentration, Municipal Water, Water Pollution, Water Pollution Sources, Sea Water, Biochemical Oxygen Demand, Suspended Solids, Copper, Chromium, Metals, Nitrogen, Phosphorous, Zinc, *Florida.
Identifiers: *Pensacola Bay(Fla), *Escambia Bay(Fla).

A study was made of the waste water discharges into Pensacola Bay and Escambia Bay, Florida, including municipal wastes, industrial wastes, and wastes from military bases. Analysis included total alkalinity, total acidity, BOD, COD, total organic carbon, total phosphorous, solids, nitrogen, chromium, copper, manganese, and zinc. Waste water sources were listed along with waste treatment procedures, receiving waters and amounts of wastes. Wood treatment plants were part of industrial waste sources. (Katz)
W75-01826

MERCURY IN SOME MARINE ORGANISMS FROM THE OSLOFJORD,
Oslo Univ. (Norway). Lab. for Marine Zoology and Marine Chemistry.
For primary bibliographic entry see Field 5C.
W75-01828

PESTICIDE LEVELS IN ESTUARINE AND MARINE FISH AND INVERTEBRATES FROM THE GUATEMALAN PACIFIC COAST,
Peace Corps-FAO Cooperative Central American Fisheries Development Program (Guatemala).
For primary bibliographic entry see Field 5C.
W75-01829

MERCURY, DDT, DIELDRIN, AND PCB IN TWO SPECIES OF ODONTOCETI (CETACEA) FROM ST. LUCIA, LESSER ANTILLES,
Guelph Univ. (Ontario). Dept. of Zoology.
D. E. Gaskin, G. J. D. Smith, P. W. Arnold, M. V. Louisy, and R. Frank.
Journal of the Fisheries Research Board of Canada, Vol 31, No 7, p 1235-1239, 1974. 1 tab, 22 ref.

Descriptors: *Mercury, *DDT, *Dieldrin, *Polychlorinated biphenyls, Methodology, Pesticides, Absorption, Path of pollutants, Metals, Chlorinated hydrocarbon pesticides, Water pollution sources.
Identifiers: *Tissue analysis, Bioaccumulation, Whales, Dolphins, *Lesser antilles(St Lucia), Odontoceti, Cetacea.

Samples of blubber, muscle, liver and kidney of short-finned pilot whale Globicephala macrohyncha and long-snouted dolphin Stenella (longirostris) from waters adjacent to St. Lucia, Lesser Antilles, were analyzed for Hg, DDT, dieldrin and PCB. Total Hg levels were high, ranging from 1.33 to 5.36 ppm in muscle (methylated fraction 42-100%), 2.28 to 14.00 ppm in kidney (methylated fraction about 14%) about 13.00 to 157.00 ppm in liver (methylated fraction 2-17%). Sigma DDT in blubber ranged from 1.25 to 7.38 ppm, dieldrin in blubber from 0.007 to 0.04 ppm, and PCB in blubber from 0.69 to 5.00 ppm. The presence of the high Hg levels is attributed largely to natural sources, as the Lesser Antilles Island Arc is a site of intense cyclic tectonic activity. Both DDT and PCB could be largely the result of atmospheric transportation from higher Atlantic latitudes, although local DDT spraying programs may have contributed. Certainly, the circulation pattern in the Gulf of Mexico and Caribbean appears to rule out water-borne transport from the river systems of the Gulf States of the United States. (Katz)
W75-01833

CONSIDERATIONS ON TESTING THE ACCUMULATION OF PESTICIDES BY MEANS OF ARTIFICIAL FOOD CHAINS,
Hamburg Univ. (West Germany). Institut fuer Hydrobiologie und Fischereiwissenschaft.
For primary bibliographic entry see Field 5C.
W75-01835

WASTE-LOAD ALLOCATION STUDIES FOR ARKANSAS STREAMS, RED RIVER BASIN, MOUNTAIN FORK, SEGMENT 1D,
Geological Survey, Little Rock, Ark.
C. T. Bryant.
Open-file report, 1974. 21 p, 2 fig, 1 tab, 5 ref, append.

Descriptors: *Low flow, *Path of pollutants, *Arkansas, Waste dilution, Model studies, Mathematical models, Water pollution control, Waste assimilative capacity.
Identifiers: *Red River(Ark), *Waste-load allocation.

Data and the results of a waste-load allocation study are presented for Segment 1D of the Red River water-quality management planning basin, Arkansas. The water-quality model was calibrated for dissolved oxygen, total dissolved solids, chlorides, and sulfates, by using streamflow and water-quality data collected during summer low-flow conditions. The minimum average flow for 7 consecutive days that is expected to occur on the average of once in 10 years is called 7-day 10-year low-flow condition. Under this condition there is no flow for the part of Mountain Fork in Segment 1D. Because of this and because there are no existing or projected waste effluents, no projected model runs were made. (Knapp-USGS)
W75-01841

REMOTE-SENSING STUDIES OF HYDROLOGIC ENVIRONMENTS IN THE LOWER RARITAN RIVER SYSTEM, NEW JERSEY,
Geological Survey, Trenton, N.J.
P. W. Anderson, and S. Subitzky.
Available from NTIS, Springfield, Va 22161, as N74-22972, $3.25 in paper copy, $2.25 in microfiche. Geological Survey open-file report, 1973. 18 p, 4 fig, 3 tab, 4 ref.

Descriptors: *Remote sensing, *Rivers, *Estuaries, *New Jersey, Thermal pollution, Dispersion, Sediment transport, *Path of pollutants, Ice cover, Water temperature.
Identifiers: *Raritan River(NJ).

The U.S. Geological Survey, in cooperation with the National Aeronautics and Space Administration, conducted a series of remote-sensing experiments in the lower Raritan River system in east-central New Jersey in January and November 1968. The airborne multisensor missions included photographic and thermal-infrared sensors operated over a single site at a time when streamflow and water-temperature observations were being made on the ground. Remote-sensing data showed the effect of thermal waste-water discharges on stream temperatures; cross-channel variations in thermal characteristics due to waste-water discharge, channel characteristics, and tidal currents; influence of flow rates on dispersion; patterns and distribution of ice cover; and movement of sediment loads. (Knapp-USGS)
W75-01850

A STUDY OF THE EFFECTS OF SECONDARY EFFLUENT ON WAIMANO AND WAIAWA STREAMS,
Hawaii Univ., Honolulu. Water Resources Research Center.
For primary bibliographic entry see Field 5C.
W75-01854

RADIOCHEMICAL ANALYSIS FOR PB-210 AND PO-210 IN ENVIRONMENTAL SAMPLES,
New Mexico Highlands Univ., Las Vegas. Inst. of Scientific Research.
S. Maestas, and A. F. Gallegos.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 907, $4.25 in paper copy, $2.25 in microfiche. New Mexico Water Resources Research Institute, Las Cruces, Report 048, Completion Report, October 1974. 60 p, 10 tab, 12 ref.

Descriptors: *Lead, *Lead radioisotopes, *Radiochemical analysis, Water pollution sources, Environmental effects, Surface water, Groundwater, *New Mexico, *Path of pollutants, *Analytical techniques, *Pollutant identification.
Identifiers: Lead-210, Palonium 210.

This study is an attempt to develop a comprehensive understanding of the content, distribution, and origin of lead in surface and ground waters in the general area of northeastern New Mexico and specifically in the northern regions of the Sangre de Cristo Mountains and the Pecos Wilderness. The research has involved (1) collection of snow, rain, surface and ground waters, water borne species, and plant and animal species for analysis; (2) development of analytical chemical techniques for the analysis of lead, lead-210 (RaD), and paloniu-210 (RaF) in all water and biological samples; (3) analysis for Pb, RaD, and RaF in all samples; and (4) design of suitable statistical and correlative means to determine whether it is possible to determine the origin of lead in waters of this region and the mechansim by which contamination occurs. This portion of the report deals with the radiochemical isolation of RaD and RaF in water and biological samples and with the analysis of these radioisotopes in the samples mentioned. (Hain-New Mexico State)
W75-01858

CHANGE OF THE CYCLE OF INORGANIC MATTER IN NATURE (DIE VERANDERUNGEN DER MINERALSTOFFKREISLAUFE IN DER NATUR),
Technische Hochschule, Vienna (Austria). Institut fuer Verfahrenstechnik und Technologie der Brennstoffe.
A. Schmidt.
Chemiker-Zeitung, No 5, p 219-222, May, 1974. 4 fig, 2 tab, 3 ref.

Descriptors: *Nutrients, *Water pollution sources, *Phosphorus, *Nitrogen, *Potassium, Industrial wastes, Fertilizers, Soil, Human wastes, Animal wastes, Environmental effects, Water pollution, Surface waters, Inorganic matter, Economics, Urbanization.

Growth of plants is made possible by a circulation of the main nutritional elements - nitrogen, phosphorus and potassium. Since the beginning of this century this circulation has been disturbed by deep changes in the economic and social structure, such as industrialization, urbanization, and population growth. On one hand, large amounts of nutrients have to be supplied to the soil in the form of fertilizers; on the other hand, human and animal wastes are the main source of pollution of the surface waters. The extent of the problem is shown and its effects are discussed. (Prague-FIRL)
W75-01870

THE RELATIVE DISTRIBUTION OF NON-AROMATIC HYDROCARBONS IN THE BALTIC IN SEPTEMBER 1971,
Kiel Univ. (West Germany). Institut fuer Meereskunde.
A. Zsolnay.
Marine Chemistry, Vol 1, No 2, p 127-136, April, 1972/3. 3 fig, 1 tab, 13 ref.

Descriptors: Sediment-water interfaces, *Bacteria, Plankton, Sediments, Aerobic bacteria, *Water pollution sources, Oil wastes, Chromatography, Separation techniques, *Pollutant identification.
Identifiers: *Non-aromatic hydrocarbons, *Baltic sea, Liquid-liquid extraction, Liquid chromatography, Micro-adsorption detectors.

Pollution by hydrocarbons may be due to industrialization and mineral oil or due to the origin and decomposition of hydrocarbons in marine sediments. The relative distribution of the total non-aromatic (saturated and olefinic) hydrocarbons and of the total saturated hydrocarbons was determined for the central Baltic in September, 1971. Only one liter of sample was required. The hydrocarbons were removed with liquid-liquid extraction, purified with liquid chromatography, and then determined by means of a micro-adsorption detector. Since hydrocarbons in nature are a very complicated mixture, it was impossible to determine their absolute concentration. Results give the concentrations in respect to a standard, consisting of water extracted from the Kiel Bight. Hydrocarbons at that time of year originated largely in situ at the sediment-water interface, presumably synthesized by anaerobic bacteria. Low hydrocarbon values appear in regions that would favor the presence of aerobic bacteria. A large amount of hydrocarbons was released by what was presumably a small plankton bloom, but may have been relatively labile. The net result is that the dissolved hydrocarbons that enter into the sediment have most likely been produced at the sediment-water interface. (Prague-FIRL)
W75-01871

A SIMPLE METHOD FOR INVESTIGATION OF THE BIODEGRADABILITY OF PRODUCTS AND CONSTITUENTS IN WASTEWATER (EIN EINFACHES VERFAHREN ZUR PRUFUNG DER BIOLOGISCHEN ABBAUBARKEIT VON PRODUKTEN UND ABWASSERINHALTSSTOFFEN),
Farbwerke Hoechst AG, Frankfurt am Main (West Germany).
R. Zahn, and H. Wellens.
Chemiker-Zeitung, No 5, p 228-232, May, 1974. 4 fig, 2 tab, 5 ref.

Descriptors: *Biodegradation, *Costs, *Analytical techniques, Tests, Effluents, Waste water(Pollution), Pollutant identification, Water pollution sources.
Identifiers: *Degradation curves, Test parameters.

A simple, cost-saving method of testing the biodegradability of products and the constituent substances of effluents is described. Various test parameters, the form of degradation curves, and the results of adaptation tests are discussed. The method described is readily reproducible. (Prague-FIRL)

W75-01873

TRACE METAL CONCENTRATIONS IN BROWN SEAWEEDS, CARDIGAN BAY, WALES,
University Coll. of Wales, Aberystwyth. Dept. of Geology.
R. Fuge, and K. H. James.
Marine Chemistry, No 4, p 281-293, December, 1973. 2 fig, 4 tab, 24 ref.

Descriptors: *Monitoring, *Marine algae, *Metals, Seasonal, Sampling, Climates, Harbors, Seas, Zinc, Cadmium, Copper, Iron, Nickel, Cobalt, *Phaeophyta, Metabolism, Costs, Mineralogy.
Identifiers: *Seaweeds, Coastal waters, Metabolic activity, *Cardigan Bay(Wales-UK).

Marine algae may be used to monitor coastal water trace-metal concentrations, as long as a careful sampling procedure is adopted. Concentrations of zinc, cadmium, copper, manganese, iron, cobalt, nickel and molybdenum were examined in brown algae, Fucus serratus and F. vesiculosus, from Cardigan Bay, Irish Sea, Great Britain. In both species a seasonal variation in metal content was observed. Zinc, cadmium, copper, iron, nickel and cobalt concentrations were highest in the spring and lowest in the autumn, probably reflecting levels of metabolic activity and climatic factors. All the studied elements, except nickel, reached highest concentrations in harbor specimens from Aberystwyth and Aberaeron where rivers draining mineralized areas enter the sea. Outside the harbors, marked regional variations were observed. Trace element concentrations varied among different species from the same locality and also varied according to position on the shore. (Prague-FIRL)
W75-01876

MERCURY IN MAN,
Los Alamos Scientific Lab., N. Mex. Health Div.
For primary bibliographic entry see Field 5A.
W75-01882

MERCURY BURDEN OF HUMAN AUTOPSY ORGANS AND TISSUES,
Washington Univ., Seattle. Dept. of Pathology.
N. K. Mottet, and R. L. Body.
Archives of Environmental Health, Vol 29, No 1, p 18-24, July, 1974. 4 fig, 5 tab, 36 ref.

Descriptors: *Human pathology, *Spectroscopy, *Mercury, Data collections, Statistical analysis, *Pollutant identification, *Assay, Analytical techniques.
Identifiers: Human kidney, *Atomic absorption spectroscopy.

A method of flameless atomic absorption spectroscopy was used to assay the total mercury burden in 14 autopsied organs and tissues from 113 persons. Ages ranged from 26 weeks of gestation to 88 years. Over 70 percent of all assays, irrespective of organs or age, had a burden of less than 0.25 micrograms/gm of wet weight. Less than 10 percent had more than 0.75 micrograms. The kidney was the organ with the most variable burden, 29 percent of the assays being above 0.75 micrograms/gm. The burden in fetal organs was more uniform than those in postnatal life. Multivariate statistical analysis suggests that the urban population has a somewhat greater mercury burden than the rural. The data did not reveal a statistically significant increase with age, suggesting that past environmental exposure levels exceed capacity of the body to eliminate mercury. (Sandoski-FIRL)
W75-01883

STABILITY OF CRUDE OIL-IN-WATER EMULSIONS,
Department of the Environment, Ottawa (Ontario). Inland Waters Directorate.
E. C. Chen.
The Journal of Canadian Petroleum, Vol 13, No 1, p 38-41, January-March, 1974. 3 fig, 1 tab, 11 ref.

Descriptors: *Emulsions, *Stability, Oil spills, Measurements, Temperature, *Oily water, *Oil-water interfaces, Oil pollution, Path of pollutants.
Identifiers: Oil-in-water emulsions, *Crude oil, *Coulter counter, Droplet size, Creaming.

A Coulter counter was used to measure the droplet-size distribution of crude oil-in-water emulsions. The stability of the emulsions was determined by the decrease in oil concentration and the change in specific surface with time. All experiments were carried out at room temperature with initial oil to water volume ratios of 0.005 and 0.01. Six different types of crude oil were investigated. All behaved similarly. Creaming was predominantly responsible for the instability of the emulsions. However, all the emulsions finally attained stability with an oil concentration of between .00001 and .001 percent volume, a specific surface of around 3 x 1000 sq cm/g and a droplet size below 4 millimicrons. (Praque-FIRL)
W75-01912

ADSORPTION OF MBAS FROM WASTEWATERS AND SECONDARY EFFLUENTS,
Rutgers - the State Univ., New Brunswick, N.J.
For primary bibliographic entry see Field 5D.
W75-01913

CHLORINE RESIDUALS IN TREATED EFFLUENTS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5D.
W75-01922

SEWAGE SLUDGE DISPOSAL IN A SANITARY LANDFILL, VOL I: SUMMARY AND CONCLUSION; VOL II: DESCRIPTION OF STUDY AND TECHNICAL DATA.
Stone (Ralph) and Co., Inc., Oceanside, Calif.
Available from the National Technical Information Service, Springfield, Va 22161, Vol I as PB-225 361, $3.75 in paper copy, $2.25 in microfiche. Vol II as PB-225 362, $10.25 in paper copy, $2.25 in microfiche. Report EPA/530/SW-61d 1973. 394 p, 56 fig, 83 tab, 57 ref.

Descriptors: *Landfills, *Waste disposal, *Sewage sludge, Liquid wastes, Tanks, Pumps, Solid wastes, Odors, Settlement, *Monitoring, *Lysimeters, Leachate, Decomposition, Pilot plants, Weather, Gases, Septic tanks, *Sludge disposal, *Path of pollutants, Water pollution sources.
Identifiers: Sanitary landfills, Septic tank pumpings.

A two volume report gives the results of work conducted during the first two years (January 1971-December 1972) of a three-year demonstration study of the disposal of liquid sewage sludge and septic tank pumpings into solid waste at a sanitary landfill. Pilot plant lysimeters were used to investigate the effects of sewage and septic tank sludges on solid waste temperature, decomposition, leachate settlement, insects, gases, and odors. Three large field lysimeters were monitored for leachate, temperature, gas compaction, settlement, and waste decomposition as determined by core sampling. The full-scale disposal of sludge was monitored for runoff, leachate, equipment operating efficiency (time and motion studies), odors, vectors, blowing litter, and weather conditions (rainfall, temperature, wind, and evaporation). (Prague-FIRL)
W75-01925

THE STATUS OF ACTIVE DEEP MINES IN THE MONONGAHELA RIVER BASIN.
Environmental Protection Agency, Wheeling, W. Va.
Available from the National Technical Information Service, Springfield, Va. 22161 as PB-227 064, $5.75 in paper copy, $2.25 in microfiche. Work Document No 46, January, 1973. 129 p, 4 tab.

Descriptors: *Strip mine wastes, *Mines, *Mine wastes, Pollution, Coal mines, Reviews, *West Virginia, Effluent streams, *Pennsylvania, Surveys, Water pollution sources.
Identifiers: *Monongahela River basin, Mine discharge, Receiving streams.

The Monongahela Enforcement Conference survey of mines in the Monongahela River basin found that forty-eight active mines produced a discharge at the time of a resurvey in 1971 and 1972. The owners or operators of 14 additional active mines reported no discharges. In Pennsylvania, the 23 active discharging deep mines had 45 discharge points, 13 of which had chemical treatment facilities. Only the Hutchison Mine, with two discharges, produced any serious pollution problems in the receiving stream. That mine and the Pennsylvania Department of Environmental Resources are presently in litigation. In West Virginia, the 25 active discharging deep mines had 112 discharge points, eight of which were receiving chemical treatment. The ten mines in the Christopher and Mountaineer Divisions of Consolidation Coal were responsible for 75 discharges. These mines and two Eastern Associated Coal Corporation mines were investigated in greater detail. It was found that the mines in the Christopher Division caused most of the stream pollution from active deep mines in the basin. (Prague-FIRL)
W75-01926

CONTINUOUS WATER QUALITY MONITORING,
Clyde River Purification Board, Glasgow (Scotland).
G. A. Best.
Effluent and Water Treatment Journal, Vol 14, No 7, p 357-364, July, 1974. 7 tab, 2 fig, 16 ref.

Descriptors: Water quality, *Water quality control, *Water analysis, *Water pollution control, Water properties, Water chemistry, Water pollution, Pollution abatement, Water demand, Water supply, Water management, Water policy, Urban drainage, Water pollution sources, Potable water, Water sources, Watersheds, Water types, Water conservation.
Identifiers: Continuous water quality monitoring, *Clyde River Purification Board(UK), United Kingdom, Ohio River Valley(Ohio), Trent Research Programme.

The number of continuous water quality monitoring systems installed by river authorities throughout the world has been increasing. In the United States, 205 monitors were operating in 1968, and more have been installed. The Ohio River was the site of the first continuous monitoring system, in 1952. Water demand for industry and homes is so great in the United Kingdom that water authorities are considering using poor quality river water as a potable water source, and urbanization is threatening clean water. Therefore, monitoring is needed. Experiences of the Clyde River Purification Board are described, including layout of monitoring station, data collection procedures, and instrument performance. Sensors which are sensitive enough to detect dangerous levels of pollution are needed, but no effective sensor detects cyanide. Monitoring stations are difficult and expensive to build, and in Scotland, where only a small amount of the water supply is taken from rivers, it seems premature to use them for supply protection. If monitoring equipment is used to measure pollution however, it should be mobile so that areas of special interest could be investigated. A submersible dissolved oxygen and temperature recorder has been introduced, but its reliability has not yet been proven. (Grden-North Carolina).
W75-01955

ACCUMULATION OF HEAVY METAL IN SHELLFISH: 1. ON THE COPPER CONTENT IN GREEN OYSTERS, (IN KOREAN),
Kunsan Fisheries Junior Technical Coll. (Republic of Korea).
For primary bibliographic entry see Field 5C.
W75-01956

CHARACTERIZATION STUDIES OF WASTEWATER GENERATED FROM MILITARY INSTALLATIONS,
Calspan Corp., Buffalo, N.Y.
L. K. Wang.
Calspan Technical Report No ND-5296-M-1, April 1973. 42 p, 14 tab, 27 ref. DAAK02-73-C0206.

Descriptors: *Waste water(Pollution), *Water pollution sources, *Waste identification, *Domestic wastes, *Industrial wastes, Organic wastes, Pollutant identification, Chemical wastes.
Identifiers: Military installations(Wastes).

The research was directed toward the identification of the characteristics of various wastewater streams generated from military bare bases. Data on the sources, volume, and nature of military wastewaters, such as laundry wastewater, kitchen and dining hall wastewaters, shower and lavatory wastewaters, human wastewater, hospital wastewater, photographic wastewaters, washrack wastewaters, and combined wastewaters, were surveyed, compiled and documented in this report. Based on the characteristic data for field kitchen, shower and laundry wastewaters, the nature of combined wastewaters derived from these three sources at various flow proportions was mathematically calculated. The calculated data for combined wastewaters were found to be in close agreement with the measured data for acutal samples. Synthetic wastewater prepared with tap water, laundry detergent, dishwasher detergent, ground bar soap, Bentonite clay, lubricating oil and canned dog food was found to have characteristics similar to those of the combined wastewater derived from field kitchens, laundries, and showers.
W75-01957

DEFINITION OF PROCEDURES FOR STUDY OF RIVER POLLUTION BY NON-POINT URBAN SOURCES,
Massachusetts Univ., Amherst. Water Resources Research Center.
F. A. DiGiano, and R. A. Coler.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-237 972, $3.25 in paper copy, $2.25 in microfiche. Termination Report, June 1974. 20 p, 1 fig, 5 tab, 11 ref. OWRR A-066-MASS(1).

Descriptors: *On-site investigations, *Water pollution sources, *Water pollution, Rivers, Storm runoff, Urban runoff, Benthic fauna, Invertebrates, Crustaceans, Insects, Diptera, Phosphorus, Nitrogen, Chlorides, Coliforms.
Identifiers: *Non-point urban pollution sources, Caleoptera, Odonata, Plecotera, Trichoptera, Ephemeroptera.

A limited field investigation was conducted at three sampling stations on the Green River, Greenville, Massachusetts to provide a preliminary characterization of non-point urban sources of pollutants originating from stormwater and snowmelt. Also included was an examination of the impact of pollutants on the benthic macroinvertebrate community. Sample station 1 was upstream of the urban area and station 2, downstream of the urban area, was three miles from station 1. Station 3 was on a tributary a short distance downstream from station 1. At each station the discharge and temperature were measured and grab samples were taken to analyze for pH, total phosphorous, Kjeldahl nitrogen, inorganic and organic carbon, chloride, and total coliforms. Basket-type artificial substrates, submerged and anchored in the river for one month, were gradually colonized by macroinvertebrates. Between stations 1 and 2, large increases in concentrations were found of total nitrogen, total phosphorus, chloride, and total coliforms. Benthic macroinvertebrate community studies at stations 1 and 2 did not reveal a large shift to pollution-tolerant species at station 2. A more detailed study of the Green River was recommended by increasing number of sampling stations, installing stream gage recorders, more frequent sampling, and maintaining accurate rainfall records. (Humphreys-ISWS)
W75-01959

DISTRIBUTION OF CONTAMINANTS IN POROUS MEDIA FLOW,
California Univ., Davis. Dept. of Water Science and Engineering.
M. A. Marino.
Water Resources Research, Vol 10, No 5, p 1013-1018, October 1974. 1 fig, 22 ref.

Descriptors: *Path of pollutants, Water pollution sources, *Dispersion, *Adsorption, *Fluid movement, Porous media, Saturated flow, Groundwater movement, Mass transfer, Mathematical studies, Equations, Seepage.
Identifiers: Isotropic convective dispersion.

A mathematical analysis was presented of simultaneous dispersion and adsorption of a solute within homogeneous and isotropic porous media in steady unidirectional flow fields. The dispersion systems adsorb the solute at rates proportional to their concentration and are subject to input concentrations that vary exponentially with time. Mathematical solutions were developed for predicting the concentration of contaminants in adsorbing and nonadsorbing porous media for prescribed media and fluid parameters. (Gibb-ISWS)
W75-01973

CARDIOVASCULAR MORTALITY, MUNICIPAL WATER, AND CORROSION,
H. A. Schroeder, and L. A. Kraemer.
Arch Environ Health, Vol 28, No 6, p 303-311, 1974.
Identifiers: *Cardiovascular mortality, Cities, Congenital, *Corrosion, *Mortality(Human), *Municipal water, Water pollution sources, Water pollution effects.

In order to examine the water factor influencing cardiovascular death rates concentrations of 35 constituents of municipal water in 94 major USA cities were correlated by computer with death rates from cerebral hemorrhage, hypertensive heart disease, other hypertensive diseases, cerebral thrombosis, arteriosclerotic heart disease, and congenital abnormalities, in all races, sexes and ages. Highly significant inverse correlations appeared for 15 constitutents with death rates from arteriosclerotic heart disease; 12 were metals. Significances increased in older age groups. Corrosiveness of water as measured by Langelier's index was directly correlated with deaths from atherosclerotic heart disease at high levels of significance. Hardness of water was a less outstanding factor. Constituents of water were less significantly correlated with other diseases, and little with congenital abnormalities. The elements affecting death rates were probably not among those measured. As corrosive tap water contains metals dissolved from pipes in houses and municipal water does not, the water factor may result from cardiotoxic metals like Cd and Sb.--Copyright 1974, Biological Abstracts, Inc.
W75-01978

CHLORIDE BALANCE OF AN URBAN BASIN IN THE CHICAGO AREA,
Illinois Univ., Chicago. Dept. of Geological Sciences.
G. M. Wulkowicz, and Z. A. Saleem.
Water Resources Research, Vol 10, No 5, p 974-982, October 1974. 5 fig, 6 tab, 26 ref.

Descriptors: *Path of pollutants, *Salt balance, *Chlorides, *Urban runoff, Water pollution sources, Salts, Water quality, *Illinois, Sampling, Winter, Discharge(Water), Urbanization.
Identifiers: *Road salt, Salt Creek Basin, *Chicago(Ill).

During the relatively mild winter of 1972-1973 20,260 metric tons of NaCl and 40 metric tons of CaC12 were spread on roads within the Salt Creek basin of the Chicago metropolitan area. Over 600 water samples were collected from 11 creek sites within the basin during the salting season. Chloride concentrations in the water varied from 35 to 1530 mg/l during the sampling period. Road salt chloride content of the water at any time is dependent on (1) temperature and colligative properties of NaCl, (2) duration of precipitation events, and (3) dilution capacity of the stream. Models were presented for three subsections of the basin based on the relationship between chloride concentration and discharge of the creek during nonsalting periods. A fourth subsection could not be modeled because of insufficient data. Monthly chloride budgets for all four subsections from November 1 through April 30 show that between 55 and 72% of the road salt chloride was removed by the creek from the various subsections. Changes in the percentage of chloride removed correlated well with the following indicators of the degree of urbanization: (1) percentage of area as streets, (2) highway density, (3) population density, and (4) road salt application per unit area. (Terstriep-ISWS)
W75-01982

AN HISTORICAL LOOK AT THE WATER QUALITY OF THE DELAWARE RIVER ESTUARY TO 1973,
Academy of Natural Sciences of Philadelphia, Pa. Dept. of Limnology.
P. Kiry.
Available from the Academy of Natural Sciences of Philadelphia, Penn. 19103, for $5.00. (1974), 135 p.

Descriptors: *Delaware River, *Water quality control, History, Water quality standards, *Dissolved oxygen, *Delaware River Basin Commission, Estuaries, *Shad, Salinity, Biochemical oxygen demand, Nitrates, Phosphates, Nitrogen, Bass, Sturgeon, Heavy metals, Phenols, Water temperature, Sediments, Hydrogen ion concentration, Waste water treatment.
Identifiers: Delaware River estuary, Ammonia-nitrogen, Orthophosphates, Cyanides.

The water quality of the Delaware River Estuary in the Philadelphia-Camden area has improved since World War II. A study of 49 years of records shows an improvement in the number of shad in the last thirteen years which must pass through this area on their migration to spawning areas further upstream. The first comprehensive study of the estuary area from Trenton, New Jersey to Liston Point, Delaware considers such technical matters as dissolved oxygen, salinity, biochemical oxygen demand, nitrate and ammonia nitrogen, orthophosphate, hydrogen ion concentration, water temperature, suspended sediments, phenolics, cyanide and heavy metal concentrations. Population trends and wastewater discharges were used as well in drawing its conclusions. Trends in shad, striped bass, sturgeon, other fishes and bacterial concentrations are also reported. The water quality criteria set forth by the Delaware River Basin Commission are discussed. Shown are five objective sets which are different dissolved oxygen levels required to maintain a percentage level of survival of the shad population along with the required treatment of waste water and the cost to reach the different levels. Alternatives to waste water treatment are briefly discussed such as in-stream aeration and piping of wastes to a place or places where the discharge will have little

economic or social effect. Improvement in water quality depends on the ability of waste treatment practices to keep pace with municipal and industrial growth.
W75-02001

EVALUATION OF THE HAZARD OF BULK WATER TRANSPORTATION OF INDUSTRIAL CHEMICALS (A TENTATIVE GUIDE).
National Academy of Sciences, Washington, D.C.
Available from the National Technical Information Service, Springfield, Va. 22161, as AD-775 756, $4.25 in paper copy, $2.25 in microfiche.
Evaluation Panel of the Committe on Hazardous Materials, Division of Chemistry and Chemical Technology, National Research Council, July 1973. 55 p, 2 tab.

Descriptors: *Chemicals, *Chemical properties, *Transportation, *Classification, *Hazards, Water pollution sources, Toxicity, Organoleptic properties, Industries, Public health, Environmental effects.

In response to a request for a systematic guide to rating the relative hazards of chemicals and other materials shipped in bulk, this extensive classification source was compiled. A total of 337 industrial chemicals are itemized and rated in regards to fire hazard, health hazards, water pollution, aesthetic effects, and reactivity with other substances. (Katz)
W75-02002

COOPERATIVE MINE DRAINAGE SURVEY, KISKIMINETAS RIVER BASIN.
Environmental Protection Agency, Wheeling, W. Va.
For primary bibliographic entry see Field 5G.
W75-02003

HEATED EFFLUENTS AND EFFECTS ON AQUATIC LIFE WITH EMPHASIS ON FISHES, A BIBLIOGRAPHY,
Ichthyological Associates, Ithaca, N.Y.
For primary bibliographic entry see Field 5C.
W75-02004

MONITORING THE QUALITY OF SURFACE WATER,
Philips Gloeilampenfabrieken N.V., Eindhoven (Netherlands).
For primary bibliographic entry see Field 5A.
W75-02010

CHANGES IN THE COMPOSITION OF CHLORINE BLEACH EFFLUENTS UPON REVERSE OSMOSIS (ZMENA ZLOZENIA CHLORACNYCH BIELIARENSKYCH VOD PO PRECHODE REVERZNEOSMOTICKYMI MEMBRANAMI),
Vyskumny Ustav Papiery a Celulozy, Bratislava (Czechoslovakia).
For primary bibliographic entry see Field 5D.
W75-02011

NOTE ON DISSOLUTION OF WOOD MATERIAL DURING PRESSURIZED REFINING, AND WATER POLLUTION CONSEQUENCES,
Swedish Forest Products Research Lab., Stockholm.
E. L. Back.
Svensk Papperstidning, Vol 77, No 11, p 394-396, Aug 25, 1974. 7 fig, 5 ref.

Descriptors: *Pulp wastes, *Water pollution sources, *Water pollution effects, Pulp and paper industry, *Carbohydrates, Dissolved solids, *Biochemical oxygen demand, Water pollution treatment, Waste treatment, *Waste water treatment, *Coagulation, Temperature, Hardwood, Softwood, Solubility, Solutes, Wastes, Aqueous solutions, Effluents, Waste water(Pollution), Pressure, Fibers(Plant), Storage.
Identifiers: Pulpwood, Groundwood, Chip groundwood, Newsprint, Asplund pulp, Mechanical pulps, Thermomechanical pulps, White water, Building boards, Fiber boards, Wood species.

During fiberization (defibration) of wood under pressure, as in the production of chip groundwood for newsprint, asplund pulp for fiber building boards, and thermomechanical pulps for various paper grades, carbohydrates and other organic substances dissolve out of the wood substance. Major process variables which affect the dissolution of water-soluble materials include the preheating temperature, the pressure, the duration of treatment, the wood species (softwoods versus hardwoods), the method of prior pulpwood storage, and the closure of the pulp mill's water circuit with its attendant reduction of pH and increase of temperature. The chemical composition and molecular weight of solids dissolved in waste waters and their relationship to the effluent's BOD are discussed, along with various methods for BOD removal by coagulation of dissolved organic solids. (Brown-IPC)
W75-02018

DISCUSSIONS ON DISPOSAL OF PAPER MILL WASTES,
Regional Engineering Coll., Tiruchirapalli (India).
For primary bibliographic entry see Field 5D.
W75-02024

MERCURY DISTRIBUTION IN AMERICAN SMELT FROM LAKE MICHIGAN,
Univ. Wis.-Parkside, Kenosha, Sci. Div.
Homer T. Knight, and Leon J. Olson.
Am Midl Nat, Vol 91, No 2, p 451-452, 1974.
Identifiers: *American smelt, Distribution, Lakes, *Mercury, Osmerus-mordax, *Lake Michigan, Water pollution sources.

The average total Hg concentration in 75 American smelt, Osmerus mordax (Mitchell), from Lake Michigan was 8.22 ng/g with significant differences in age groups and sexes.--Copyright 1974, Biological Abstracts, Inc.
W75-02043

HERBAGE PRODUCTION AND THE ACCUMULATION OF SOIL NITROGEN UNDER IRRIGATED PASTURES ON THE RIVERINE PLAIN,
Commonwealth Scientific and Industrial Research Organization, Deniliquin (Australia). Riverina Lab.
For primary bibliographic entry see Field 3F.
W75-02051

BACTERIAL GRADIENTS AT THE SEDIMENT: WATER INTERFACE OF SHALLOW LAKES,
Magyar Tudomanyos Akademia, Tihany. Biological Research Inst.
J. Olah.
Ann Inst Biol (Tihany) Hung Acad Sci. 40, p 219-225, 1973, Illus.
Identifiers: Bacterial gradients, *Hungary(Lake Balaton), Lakes, Membrane filters, Shallow waters, Trophic levels, *Lake sediments, *Sediment-water interfaces.

During the last 40 yr the number of aerobic heterotrophic bacteria on the sediment surface of Lake Balaton (Hungary) increased from a value of 1000 cell/g wet sediment to 10 to the fifth power. During the same period the quantity of the heterotrophic bacterioplankton showed no significant change. Most bacteria occurred in the upper 1 cm layer of the sediment. In the deeper sediment layers and in the water layers above the bottom their number decreased rapidly. During the last 30 yr the number of anaerobic bacteria on the sediment surface increased at least by 1 order of magnitude. In the bottom water layers there were no anaerobic bacteria. In the deeper reduced sediment layers their number increased or decreased depending on the different media used. The quantity of bacteria counted on the membrane filter increased from a value of 3 x 10 to the eighth power/g wet sediment (Lake Balaton) to 10 to the tenth power in lakes with different trophic levels.--Copyright 1974, Biological Abstracts, Inc.
W75-02065

NUTRITIONAL INFLUENCES ON THE TOXICITY OF ENVIRONMENTAL POLLUTANTS,
Environmental Health Consultation Service, Ojai, Calif.
For primary bibliographic entry see Field 5C.
W75-02068

SOURCES OF VANADIUM IN PUERTO RICAN AND SAN FRANCISCO BAY AREA AEROSOLS,
Yale Univ., New Haven, Conn. Dept. of Geology and Geophysics.
C. S. Martens, J. J. Wesolowski, R. Kaifer, W. John, and R. C. Harriss.
Environmental Science and Technology, Vol 7, No 9, p 817-820, September, 1973. 6 fig, 5 tab, 16 ref.

Descriptors: *Vanadium, *Air pollution, *California, *Water pollution sources, On-site collections, Analytical techniques, Soils, Aluminum, Sampling, *Puerto Rico, *Path of pollutants.
Identifiers: *San Francisco Bay.

The origins of vanadium were investigated by comparing the abundances and particle size distribution of vanadium to that of the other elements found in the atmospheres of the San Francisco Bay and Puerto Rico areas. Atmospheric sampling was carried out at nine stations in the San Francisco Bay area and at four stations on the island of Puerto Rico. Both soil and combustion appeared to me major contributors of vanadium in the San Francisco Bay area atmosphere, the soil providing the larger particles and the combustion the smaller particles. Vanadium sampled in Puerto Rican experiments was thought to be primarily from a soil source. The similar behavior of vanadium and aluminum in Puerto Rican orographic clouds further suggested soil origin for the vanadium, although the soil dust does not appear to have average crustal composition, especially in the case of aluminum which was depleted. (Jernigan-Vanderbilt)
W75-02076

LEAD AEROSOL POLLUTION IN THE HIGH SIERRA OVERRIDES NATURAL MECHANISMS WHICH EXCLUDE LEAD FROM A FOOD CHAIN,
Aoyama-Gakuin Univ., Tokyo (Japan). Coll. of Science and Engineering.
For primary bibliographic entry see Field 5A.
W75-02088

THE SORPTION OF SILVER BY POORLY CRYSTALLIZED MANGANESE OXIDES,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 2K.
W75-02089

ELEMENTAL MERCURY EVOLUTION MEDIATED BY HUMIC ACID,
Georgia Univ., Athens. Dept. of Zoology.
J. J. Alberts, J. E. Schindler, R. W. Miller, and D. E. Nutter.
Science, Vol 184, No 4139, p 895-897, May 24, 1974. 2 fig, 11 ref. EPA(R-800427) Grant.

Descriptors: *Mercury, *Humic acids, *Aqueous solutions, *Chemical reactions, Tracers, Organic matter, Inorganic compounds, Testing procedures.

Elemental mercury was formed in aqueous solutions by the chemical reduction of mercuric ion in the presence of humic acid; the humic acid was obtained from a farm pond sediment. Extraction and purification were accomplished by standard procedures; the purified material had the following composition, in percentages by weight; C, 48.9; H, 6.8; O, 28.0; N, 5.3; S, 1.7; and ash, 9.3. The reduction proceeded via first order kinetics (rate constant, 0.009/hour) and was dependent on pH. The reaction mechanisms involved interaction of this ionic metal species with the free radical electrons of the humic acid. From these and other results it appeared that elemental mercury evolution must be considered as a possible mobilization pathway for mercury and its compounds in the environment. (Jernigan-Vanderbilt)
W75-02090

PREDICTING MINERAL SOLUBILITY FROM RATE DATA: APPLICATION TO THE DISSOLUTION OF MAGNESIAN CALCITES,
State Univ. of New York, Buffalo. Dept. of Geological Sciences.
For primary bibliographic entry see Field 2K.
W75-02091

SEASONAL CHANGE OF THE ORGANIC CARBON CONTENT OF LAKE BALATON DURING 1972,
Magyar Tudomanyos Akamedia, Tihany. Biological Research Inst.
A. Franko, and J. Ponyi.
Ann Inst Biol (Tihany) Hung Acad Sci. 40, p 185-189, 1973, Illus.
Identifiers: Carbon, Hungary(Lake Balaton), Lakes, *Organic carbon, *Seasonal, Vegetation.

Determinations of organic C content obtained by means of the 'dry' and 'wet' methods of oxidation were used on the mud of the open water of Lake Balaton, Hungary. The dry method gives higher values above 2% organic C content than the wet. Apart from Keszthely Bay, the organic C content in the mud of the open water of Lake Balaton shows a relatively uniform distribution; it varies between 1.52-1.78%. The amount of the organic C changes seasonally in the transverse section through Keszthely Bay. It was 1.83-1.85% during summer (June-Aug.) and 1.96-2.27% during spring and autumn. The autumnal increase is a consequence of the destruction of the macrovegetation.--Copyright 1974, Biological Abstracts, Inc.
W75-02093

DEPOSITION OF DEEP-SEA MANGANESE MODULES,
Pennsylvania State Univ., University Park. Ore Deposits Research Section.
D. A. Crerar, and H. L. Barnes.
Geochimica et Cosmochimica Acta, Vol 38, No 2, p 279-300, 1974. 4 fig, 3 tab, 107 ref, append. NSF GA-1689, GA-25702, GA-36815X.

Descriptors: *Manganese, *Chemical precipitation, *Sea water, Oxidation, Adsorption, Chemical reactions, Trace elements, *Water pollution sources, Aquatic microbiology, *Path of pollutants.

The manganiferous phases of Mn nodules originate by catalytic oxidation and adsorption of Mn ions upon suitable submarine surfaces. Oxidizing Eh develops at the surface of such nuclei as silicate, carbonate, and animal detritus, as well as fine-grained Mn02 and Fe(OH)3. Adsorption mechanisms effectively accelerate oxidation by elevating local Eh, and at the same time lowering reaction activation energies. Once initiated, Mn deposits are self-perpetuating because both Fe and Mn are autocatalytically precipitated upon nodule surfaces. Without locally high Eh's, nodules and ferromanganese deposits would rapidly corrode, redissolving in bottom waters grossly undersaturated in Mn. The mineral birnessite forms in kinetic preference to the thermodynamically more stable phase pyrolusite. Todorokite, which contains more Mn(2+) component than birnessite apparently is favored by somewhat less oxidizing environments and/or increased diagenetic Mn mobility. Accreting nodules incorporate high trace-element contents through simple surface adsorption and by cation substitution with characteristically disordered lattices. (Jernigan-Vanderbilt)
W75-02095

PHYTOCHROME STABILITY IN VITRO - I, EFFECT OF METAL IONS,
Reading Univ. (England). Philip Lyte Memorial Research Lab.
For primary bibliographic entry see Field 5C.
W75-02096

SOME REMARKS ON THE METHOD OF PRODUCTION ESTIMATION,
Akademiya Nauk SSSR, Leningrad. Zoologicheskii Institut.
For primary bibliographic entry see Field 2H.
W75-02097

CONCENTRATION OF HEAVY METALS BY COMPLEXATION ON DITHIOCARBAMATE RESINS,
Noxell Corp., Baltimore, Md.
J. F. Dingman, K. M. Closs, E. A. Milano, and S. Siggia.
Analytical Chemistry, Vol 46, No 6, p 774-777, May, 1974. 1 fig, 2 tab, 7 ref.

Descriptors: *Heavy metals, *Resins, *Analytical techniques, *Water treatment, Mercury, Copper, Lead, Cadmium, Nickel, Zinc, Cobalt, Calcium, Spectroscopy, Testing procedures, Laboratory tests, *Water pollution sources, Waste water treatment.

The purpose was to synthesize a resin containing dithiocarbamate groups and determine its applicability for concentrating trace metals from aqueous media. A batch equilibration technique was employed for investigation of the metal uptake by the resin. The resin was analyzed for elemental sulfur to determine the extent of the carbon disulfide-amine reaction. The result was 9.5% sulfur by weight, indicating that approximately one in every four amines had undergone reaction to the dithiocarbamate. The results of the metal uptake studies indicated that quantitative uptakes are achieved for Ag(+), Hg(2+), Cu(2+), Sb(3+), Pb(2+), and Cd(2+). The uptakes for Ni(2+), Zn(2+), and Co(2+) are expected to increase when columns are used since more contact area will be present. Alkali metals and alkaline earths should not interfere since they are not complexed by the dithiocarbamate resin. (Jernigan-Vanderbilt)
W75-02098

THE LIMNOLOGY OF A THERMAL LAKE, LAKE ROTOWHERO, NEW ZEALAND: I. GENERAL DESCRIPTION AND WATER CHEMISTRY,
Department of Scientific and Industrial Research, Lower Hutt (New Zealand). Ecology Div.
R. H. S. McColl.
Hydrobiologia, Vol 43, No 3/4, p 313-332, 1973, Illus.
Identifiers: Chlorophyll, Lakes, Limnology, *New Zealand(Lake Rotowhero), Oxygen, *Thermal lakes, Water temperature, *Water chemistry, Acidic waters.

The topography, morphology, hydrography, temperature conditions and water chemistry of an acid thermal lake, Lake Rotowhero, North Island, New Zealand, were studied and related to lake biology. Results are given for analyses of O2, pH, conductivity, Ca, Mg, Na, K, SO4, Cl, Si, total-P, reactive-P, NH4-N, NO3-N, NO2-N, As, Fe, Mn, Zn, Cu, total dissolved solids, chlorophyll and total pigment. Sediment mineralogy and total C content are mentioned.--Copyright 1974, Biological Abstracts, Inc.
W75-02099

LOCALIZATION OF LEAD ACCUMULATED BY CORN PLANTS,
Illinois Univ., Urbana. Dept. of Agronomy.
C. Malone, D. D. Koeppe, and R. J. Miller.
Plant Physiology, Vol 53, No 3, p 388-394, March, 1974. 17 fig, 1 tab, 26 ref. NSF(GI31605) Grant.

Descriptors: *Lead, *Corn(Field), *Cytological studies, Agronomic crops, Analytical techniques, Microscopy, Electron microscopy, Soil-water-plant relationships, Plant physiology, *Absorption, *Pollutant identification.

Light and electron microscopic studies of corn plants (Zea mays L.) exposed to Pb in hydroponic solution showed that the roots generally accumulated a surface Pb precipitate and slowly accumulated Pb crystals in the cell walls. The root surface precipitate formed without the apparent influence of any cell organelles. In contrast, Pb taken up by roots was concentrated in dictyosome vesicles. Dictyosome vesicles containing cell wall material fused with one another to encase the Pb deposit. This encased deposit which was surrounded by a membrane surrounding the deposit fused with the plasmalemma. The material surrounding the deposit then fused with the cell wall. The result of this process was a concentration of Pb deposits in the cell wall outside the plasmalemma. Similar deposits were observed in stems and leaves suggesting that Pb was transported and deposited in a similar manner. (Jernigan-Vanderbilt)
W75-02100

CADMIUM IN THE ENVIRONMENT: AN ANNOTATED BIBLIOGRAPHY,
Oak Ridge National Lab., Tenn. Environmental Information Systems Office.
E. D. Copenhaver, G. U. Ulrikson, L. T. Newman, and W. Fulkerson.
Oak Ridge National Laboratory report No ORNL-EIS-73-17, April, 1973. 451 p, 3 index. AEC(W-7405-eng-26)NSF(AAAR-4-79).

Descriptors: *Cadmium, *Environment, *Bibliographies, *Abstracts, Mining, Separation techniques, Air pollution, Water pollution, Chemistry, Waste disposal, Analytical techniques, Monitoring, Pollution abatement, Animal physiology, Plant physiology, Toxicity, Public health, Path of pollutants, Water pollution effects.

This book is an extensive compilation of abstracts in a bibliographical format dealing with cadmium in the environment. It contains an introduction, an index on authors, an index on keywords, and a permuted index on titles. For greater ease in use as a reference tool, it is subdivided into the following sections: (1) Reviews and Bibliographies; (2) Natural Occurrence, Mining and Extraction; (3) Uses and Consumption; (4) Pollution of Air and Water, Chemistry and Waste Disposal; (5) Analytical Methods and Monitoring Equipment; (6) Control, Abatement, and Restoration; (7) Physiological and Toxicological Aspects in Plants, Animals and Man. (Jernigan-Vanderbilt)
W75-02102

TRACE ELEMENTS IN WATER: ORIGIN, FATE, AND CONTROL: I MERCURY.
Stanford Univ., Calif.
Report of Progress, Stanford University, California, March 1, 1972 to February 1, 1973. 241 p, 79 fig, 40 tab, 190 ref, 3 append. RANN No GI-32943.

Descriptors: *Trace elements, *Mercury, Geologic surveys, Mining, Mine water, Mineralogy, Mine drainage, Sediments, Sampling, On-site tests, Testing procedures, Oxidation, Chemical reac-

tions, Analytical techniques, Spectroscopy, Radioactive tracers, Adsorption, Ion exchange, *Path of pollutants, *Water pollution sources, *Water pollution control, *California.
Identifiers: San Francisco Bay, New Almaden Area(Calif).

This report details an interdisciplinary team of scientists' effort to contribute fundamental knowledge of the sources of trace elements, the forms in which they are present and the mechanisms by which they are released, transported, and fixed, and might be controlled, all primarily in the natural environment. The aims were to: (1) Determine the types of sources and sinks and the location of probable important fluxes of mercury in an area or areas chosen to include typical problem environments; (2) Describe and model release transportation and fixation fluxes in typical environments; (3) Identify opportunities for pollution control and plan for study methods. To analyze the compiled data it was planned to develop analytical and characterization methods and provide capability for analytical work and obtain essential fundamental chemical and biological data. The team at the time of this report was in the process of identifying the principal types of sources and sinks of mercury in natural environments in the South San Francisco Bay Region; identifying the principal release transport and fixation mechanisms and developing an understanding of these mechanisms so that alternative strategies for control of mercury can be adequately evaluated. (Jernigan-Vanderbilt)
W75-02103

TRANSPORT OF LEAD 203 AND CALCIUM 47 FROM MOTHER TO OFFSPRING,
Yugoslav Academy of Sciences and Arts, Zagreb. Inst. for Medical Research and Occupational Health.
For primary bibliographic entry see Field 5C.
W75-02108

VARIATION OF BIOLOGICAL HALF-LIFE OF METHYLMERCURY IN MAN,
Mosul Univ. (Iraq). Dept. of Physics.
For primary bibliographic entry see Field 5C.
W75-02110

PHARMACODYNAMICS OF METHYL MERCURY IN THE RAINBOW TROUT (SALMO GAIRDNERI): TISSUE UPTAKE, DISTRIBUTION AND EXCRETION,
State Univ. of New York, Buffalo. Dept. of Biochemistry.
For primary bibliographic entry see Field 5C.
W75-02112

HYDROLOGY OF THE ABANDONED COAL MINES IN THE WYOMING VALLEY, PENNSYLVANIA,
Geological Survey, Harrisburg, Pa.
J. R. Hollowell.
Open file report 74-237, 1974. 47 p, 6 fig, 3 tab, 5 ref, append.

Descriptors: *Acid mine water, *Mine acids, *Water pollution control, *Path of pollutants, *Pennsylvania, Mine drainage, Surface-groundwater relationships, Coal mines, Mine water, Mining engineering.
Identifiers: *Wyoming Valley(Pa).

Mine-water discharge into the Susquehanna River from the Northern Anthracite Field of Pennsylvania degrades the river's quality during periods of low flow to a point critical for subsistence of aquatic life. To determine what measures are required to provide a better quality mine-water discharge in the Wyoming Valley, mine hydrology and mine-water quality were studied in relation to mine-pool management. The addition of more mine-pool outlets would increase the rate of discharge and reduce interpool flow; this would reduce the total mineral load discharged to the river. Additional outlets would also act as relief overflows to reduce the maximum fluctuation of mine-pool levels, decrease related mine-surface instability, and eliminate surface flooding. (Knapp-USGS)
W75-02128

DISTRIBUTION OF OCEANIC WATER TYPES OFF SOUTH-EASTERN TASMANIA (AUSTRALIA), 1973,
Commonwealth Scientific and Industrial Research Organization, Cronulla (Australia). Div. of Fisheries and Oceanography.
B. S. Newell.
Division of Fisheries and Oceanography Report No 59, 1974. 15 p, 6 fig, 3 tab, 15 ref.

Descriptors: *Australia, *Ocean currents, *Water types, *Seasonal, *Path of pollutants, Seawater, Coasts, Ocean circulation, Density stratification, Summer, Winter, Waste disposal, Water pollution sources, Zinc.
Identifiers: *Tasmania, *Zinc processing wastes.

Survey cruises in February and September 1973 measured the oceanographic properties of the waters off south-eastern Tasmania with particular reference to the likely movement of zinc processing wastes to be dumped in the ocean. The distribution of water types below 200 m depth in summer and 300 m depth in winter follows the classical pattern and shows no marked seasonal changes. The distribution in the upper layers, however, is complex and shows marked seasonal change. In summer, there were an onshore coastal water, an offshore subtropical surface water, an intermediate layer of subtropical lower water, and a small intrusion of Sub-arctic surface water. The upper layers were well stratified. In winter, only an onshore subtropical water and an offshore Subarctic water could be recognised, and the waters were thoroughly mixed down to 300 m. Material introduced into upper waters in winter is almost certain to be carried eastwards away from the area, but in summer it is possible that some may move inshore. (CSIRO)
W75-02173

ADSORPTION OF HG(II) BY FERRIC HYDROXIDE,
University of Southern California, Los Angeles. Environmental Engineering Program.
R. A. Lockwood, and K. Y. Chen.
Environmental Letters, Vol 6, No 3, p 151-166, 1974. 4 fig, 11 ref. EPA Research Fellowships 1-F-WP-26, 620-01, and U-9-10008.

Descriptors: *Adsorption, *Mercury, *Isotherms, *Alkalis(Bases), Trace elements, Sea water, Solubility, Testing procedures, Analytical techniques, Spectroscopy, Chemical precipitation, *Iron oxides, Pollutant identification.
Identifiers: Freundlich isotherm.

Iron (III) oxide precipitated from Fe(S04)3 by NaOH was found to adsorb Hg (II) over the pH range from 3 to 10. Adsorption was not found to be affected by pH in the range from 4 to 10, but dropped off sharply between pH 4 and pH 3. Chloride additions at the 0.6M level inhibited adsorption of Hg (II) at neutral pH, but not above pH 10; Hg(OH)2 was found to be the adsorbed species. In solutions with low ionic strength the adsorption by Fe(OH)3 follows the form of the Freundlich isotherm in the neutral range; Hg(II) is adsorbed less strongly on Fe(OH) 3 than on Mn02. The corresponding exponential Freundlich constants for Fe(OH)3 are: 293 for the coefficient and 0.76 for the exponent of the equilibrium concentration of Hg (II) in solution. This is far less than 1.9 x 10 to the 10th power for the coefficient and 1.73 for the exponent of the equilibrium concentration of mercury in solution in the case of Mn02 adsorbent. (Jernigan-Vanderbilt)
W75-02200

5C. Effects Of Pollution

A MATHEMATICAL MODEL OF A TWO-LAYER ECOLOGICAL LAKE SYSTEM, (IN RUSSIAN),
Akademiya Nauk SSSR, Leningrad. Institut Evolyutsionnoi Fiziologii i Biokhimii.
V. V. Menshutkin.
Gidrobiol Zh, Vol 9, No 6, p 30-35, 1973, Illus. English summary.

Descriptors: *Mathematical models, Ecosystems, Lakes, Water pollution effects.
Identifiers: Bacteria, Ecological studies, *Eutrophication, Fish, Phytoplankton, Productivity, Temperature, Zooplankton, *Oxygen hysteresis.

A mathematical model of the lake ecological system is given, with special reference to vertical zonality of temperature and content of dissolved and suspended substances in water. The seasonal changes in phytoplankton and bacterial productivity, as well as zooplankton, benthic and fish biomass are considered. Processes of eutrophication, fish suffocation kill and O2 hysteresis were studied.--Copyright 1974, Biological Abstracts, Inc.
W75-01653

EFFECT OF LEAD ON DELTA-AMINOLEVULINIC ACID DEHYDRATASE ACTIVITY IN RED BLOOD CELLS--II. REGENERATION OF ENZYME AFTER CESSATION OF LEAD EXPOSURE,
Yrkesmedicinska Kliniken, Lund (Sweden).
B. Haeger-Aronsen, M. Abdulla, and B. I. Fristedt.
Archives of Environmental Health, Vol 29, No 3, p 150-153, September, 1974. 4 fig, 1 tab, 1 ref.

Descriptors: *Lead, *Enzymes, Organic compounds, Human physiology, Biochemistry, Public health.

The regeneration of delta-aminolevulinic acid dehydratase (ALA-D) and its correlation with blood lead after cessation of exposure to lead was studied. The regeneration of ALA-D after cessation of lead exposure was studied in 31 men who had worked in a storage battery plant. At the same blood lead concentration the ALA-D activity was found to be slightly higher in those whose exposure had terminated than in those continuing exposure. Regeneration was faster in those men with a shorter exposure to lead and a lower blood lead at cessation of exposure. In contrast with the ALA-D activity in the red blood cells, the excretion of ALA in the urine becomes normal relatively quickly after cessation of exposure to lead. This parameter, therefore, is not suitable for revealing suspected past exposure to lead. (Jernigan-Vanderbilt)
W75-01654

MODE OF ACTION OF SELENIUM AND VITAMIN E IN PREVENTION OF EXUDATIVE DIATHESIS IN CHICKS,
Cornell Univ., Ithaca, N.Y. Dept. of Poultry Science.
T. Noguchi, A. H. Cantor, and M. L. Scott.
Journal of Nutrition, Vol 103, No 10, p 1502-1511, October, 1973. 12 fig, 1 tab, 20 ref.

Descriptors: *Trace elements, *Vitamins, Animal pathology, *Animal physiology, *Poultry, Laboratory animals, Birds, Toxicity.
Identifiers: *Selenium.

Using a crystalline amino acid diet very low in selenium and vitamin E, experiments were conducted that showed that the glutahione peroxidase (GSHpx) level of chick plasma is directly related to the selenium level in the diet and to the effectiveness of selenium in prevention of exudative

diathesis. Dietary Vitamin E and selenium are both necessary for protection of hepatic mitochondrial and microsomal membranes from ascorbic acid-induced lipid peroxidation in vitro. The results favor the hypothesis that the plasma GSHpx present when the diet contains adequate selenium acts to prevent exudative diathesis by destroying peroxides that may form in the plasma and/or cytosol of the capillary cell. Vitamin E appears to prevent exudative diathesis by acting within the lipid membrane where it neutralizes free radicals, thereby preventing a chain-reaction autoxidation of the capillary membrane lipids. (Jernigan-Vanderbilt)
W75-01655

EFFECT OF FLUORIDE ON BONE FORMATION AND STRENGTH IN JAPANESE QUAIL,
California Univ., Davis. Dept. of Nutrition.
M. M. Chan, R. B. Rucker, F. Zeman, and R. S. Riggins.
Journal of Nutrition, Vol 103, No 10, p 1431-1440, October, 1973. 5 fig, 6 tab, 27 ref. NIH (AM-14403).

Descriptors: *Fluorides, *Calcium, *Animal physiology, *Birds, Laboratory animals, Laboratory tests, Magnesium.
Identifiers: Japanese quail.

The effect of fluoride on bone metabolism was studied using Japanese quail fed diets containing 1.2% calcium, 1.2% calcium + 0.075% fluoride, 0.4% calcium, and 0.4% calcium +0.075% fluoride. In the first experiments, quail were fed the diets immediately after hatching. Low calcium intake (0.4$) resulted in a 23% reduction in body weight, a 38% decrease in bone ash and a twofold elevation in bone pyrophosphatase levels compared with controls (1.2% calcium) after 11 days of treatment. Supplementation of fluoride to the low calcium diet, however, resulted in increased calcium retentions, growth rates, and bone ash. The bone calcium/phosphorus ratio did not vary significantly and did not appear to be affected by the experimental diets. An elevation of bone magnesium, however, was observed in both of the fluoride-supplemented groups as well as the low calcium group compared with the control. Tetracycline labeling studies indicated a significant increase in periosteal bone formation in the fluoride-supplemented groups; an increase in the number of osteons appeared to be present in bone sections from fluoride-treated birds. The results demonstrated that fluoride supplementation increases calcium retention, but at a high level has little effect on bone integrity and strength. (Jernigan-Vanderbilt)
W75-01660

INFLUENCE OF WHOLE GRAIN PRODUCTS, PHOSPHATES, AND TIN UPON DENTAL CARIES IN THE RAT,
Indiana Univ. Purdue Univ. at Indianapolis. Indiana Oral Health Research Inst.
J. L. McDonald, Jr., and G. K. Stookey.
Journal of Nutrition, Vol 103, No 11, p 1528-1532, November, 1973. 3 tab, 17 ref.

Descriptors: *Grains(Crops), *Wheat, *Phosphates, *Tin, *Rodents, Animal physiology, Foods, Laboratory animals, Laboratory tests, Microscopy.

A series of three experimental dental caries studies was conducted in rats to investigate the cariogenicity of whole and refined grain products and the cariogenic value of phosphate and tin (II) added to refined grain flour. In the first study, the addition of (NaPO3)3 to white bread significantly reduced its cariogenicity. In the second study, the provision of dark wheat flour in place of white wheat flour resulted in a significant reduction in caries prevalence. In the final study, 43.6% fewer lesions were observed in animals provided a diet containing whole wheat bread as opposed to white bread. In the same study the addition of (NaPO3)3 to white bread significantly reduced its cariogenicity by 31.5%. The addition of tin (II) as SnC12 in bread did not exert an additive influence upon the cariostatic properties of (NaPO3)3. (Jernigan-Vanderbilt)
W75-01661

EFFECT OF LOW CALCIUM DIET ON BONE AND CALCIUM METABOLISM IN RATS AND MICE - A DIFFERENTIAL SPECIES RESPONSE,
Hebrew Univ., Rehovoth (Israel). School of Nutrition and Domestic Sciences.
I. Walinsky, and K. Guggenheim.
Comparative Biochemistry and Physiology, Vol 49A, No 1, p 183-195, September, 1974. 6 tab, 33 ref.

Descriptors: *Calcium, *Diets, *Rodents, *Animal physiology, Animal pathology, Laboratory tests, Testing procedures, Absorption.

The effects of administration of a low-calcium diet (-Ca) to young rats (Rattus norvegicus) and mice (Mus musculus) on some parameters of calcium metabolism were studied. The administration of a -Ca diet decreased both bone ash content and concentration of serum calcium. These effects were less marked in the mouse than in the rat. Fluoride was without effect on the degree of osteoporosis in both rodent species fed a -Ca diet. Mice fed a -Ca diet absorb calcium more efficiently from the diet than rats fed a similar diet. When fed a -Ca diet there was an increase in the concentration of calcium-binding activity in duodenal mucosa of the mouse but not in the rat. Rats grow faster than mice on either a -Ca or +Ca diet. However, the difference in growth between -Ca and +Ca rats becomes greater with increasing age, in contrast to mice. It appeared that in mice calcium deficiency induces two kinds of adaptation, thus largely avoiding bone rarefaction: improved utilization of dietary calcium and diminished skeletal growth. In rats, these mechanisms are less effective and osteoporosis results. (Jernigan-Vanderbilt)
W75-01662

SLOWED LEARNING IN LAMBS PRENATALLY EXPOSED TO LEAD,
Iowa State Univ., Ames. Coll. of Veterinary Medicine.
T. L. Carson, G. A. Van Gelder, G. C. Karas, and W. B. Buck.
Archives of Environmental Health, Vol 29, No 3, p 154-156, September, 1974. 1 fig, 1 tab, 31 ref.

Descriptors: *Lead, *Toxicity, *Mammals, *Behavior, *Laboratory animals, Laboratory tests, Testing procedures, Animal pathology.

Two groups of ewes were given lead sufficient to maintain mean blood lead levels of 34 micrograms/100 ml (fed 4.5 mg/kg lead/day) and 18 micrograms/100 ml (fed 2.3 mg/kg lead/day), respectively, throughout gestation. Lambs from the two lead-exposed groups and from control ewes had blood lead levels of 24 micrograms, 17 micrograms and 6 micrograms/100 ml, respectively at 2 to 4 weeks of age. Between 10 and 15 months of age, the lambs prenatally exposed to maternal blood lead levels of 34 micrograms/100 ml required significantly more days to learn visual discrimination problems, while lambs exposed to maternal blood lead levels of 17 micrograms/100 ml did not differ from the controls. (Jernigan-Vanderbilt)
W75-01664

EFFECTS OF DIETARY ZINC ON ZINC ENZYMES IN THE RAT,
Harvard School of Public Health, Boston, Mass. Dept. of Nutrition.
A. M. Huber, and S. N. Gershoff.
Journal of Nutrition, Vol 103, No 8, p 1175-1181, August, 1973. 5 tab, 36 ref. PHS (86-88-177).

Descriptors: *Zinc, *Diets, *Enzymes, *Rodents, *Animal physiology, Organic compounds, Laboratory tests, Assay.

The effects of alterations in dietary zinc on tissue levels of four zinc metalloenzymes (carbonic anhydrase, lactic dehydrogenase, glutamic dehydrogenase, alkaline phosphatase) in rats were studied. Groups of 4-week-old rats were fed diets ad libitum containing 1, 30 (control), and 1200 ppm zinc for 2 or 4 weeks. In an attempt to distinguish zinc deficiency per se from the effects of inanition that accompanies zinc deficiency, rats in a fourth group receiving 20 ppm zinc were pair-fed with the zinc-deficient group. Tissue enzyme analyses at the end of the experimental periods indicated that zinc deficiency per se significantly depressed carbonic anhydrase activity in stomach and pituitary; lactic dehydrogenase in heart, kidney and gastrocnemius muscle; alkaline phosphatase in duodenum, kidney, stomach and serum during at least one of the periods studied. The significantly decreased carbonic anhydrase activities in brain and red cells, and the decreased alkaline phosphatase in heart of zinc-deficient animals seemed to be in part related to alterations in food intake. Feeding of high zinc diets depressed carbonic anhydrase activity and increased alkaline phosphatase in some tissues when compared to ad libitum-fed rats. Mitochondrial glutamic dehydrogenase was not affected by low or high dietary zinc intakes in any tissues analyzed. (Jernigan-Vanderbilt)
W75-01666

AVAILABILITY OF MAGNESIUM: BALANCE STUDIES IN RATS WITH VARIOUS INORGANIC MAGNESIUM SALTS,
Mead Johnson Research Center, Evansville, Ind. Dept. of Nutritional Research.
D. A. Cook.
Journal of Nutrition, Vol 103, No 9, p 1365-1370, September, 1973. 3 tab, 24 ref.

Descriptors: *Magnesium, *Rodents, *Inorganic compounds, *Calcium, *Salts, Absorption, Animal physiology, Laboratory tests, Laboratory animals, Diets.

This study was conducted to determine the relative availability of magnesium from six inorganic magnesium salts. Magnesium balance was determined in weanling rats fed diets containing either 200 or 400 mg added magnesium per kilogram as the carbonate, chloride, oxide, phosphate, sulfate or silicate. Coprophagy was prevented by tail cups. Magnesium carbonate was the most available form in this study based on percentage absorption, percentage retention and femur magnesium concentration. Availability of magnesium as the chloride was nearly equivalent to that of magnesium carbonate. Although absorption and retention of magnesium provided as the oxide, phosphate, sulfate and silicate salts were slightly lower than that of carbonate or chloride, all of the salts were nearly equivalent in their ability to support growth, plasma magnesium levels and kidney magnesium concentrations. Neither the salt form nor the dietary level of magnesium had any significant effect on calcium absorption or retention, or on calcium concentration in plasma or kidney. (Jernigan-Vanderbilt)
W75-01667

THE EFFECTS OF COPPER, MERCURY, AND ZINC ON THE UPTAKE AND DISTRIBUTION OF CADMIUM-115M IN THE ALBINO RAT,
Purdue Univ., Lafayette, Ind. Dept. of Bionucleonics.
K. E. Shank, and R. J. Vetter.
Environmental Letters, Vol 6, No 1, p 13-18, 1974. 3 fig, 10 ref. PHS (5-TO1-RL-00064-10).

Descriptors: *Cadmium, *Rodents, *Pollutants, *Absorption, *Distribution, Copper, Zinc, Public health, Human pathology, Laboratory animals,

Analytical techniques, Inorganic compounds, Mercury, Heavy metals.

This investigation was undertaken to see what effects copper, mercury, and zinc have on the uptake and distribution of cadmium. Four groups of male adult albino rats were used. One group, the control, was administered only cadmium. The other three groups each received a single simultaneous administration of copper and cadmium, mercury and cadmium, or zinc and cadmium. The three metals produced an increase in cadmium uptake in the liver. Although the mercury ratios were less than the copper and zinc ratios, they were shown to have approximately the same effect on cadmium retention. At the two higher ratios, each of the accompanying metals caused an increase of over 100% in cadmium concentration in the liver. The metals at all ratios caused a decrease in cadmium uptake in the kidneys. Copper and mercury produced progressively lower levels of cadmium in the kidneys as their ratios increased. It was concluded that copper, mercury, and zinc, while having a definite effect on cadmium uptake and distribution in the albino rat, had no effect on the concentration in the blood.
W75-01671

EFFECTS OF THE HERBICIDE PARAQUAT ON THE ECOLOGY OF A RESERVOIR: II. COMMUNITY METABOLISM,
University of Wales Inst. of Science and Tech., Cardiff. Dept. of Applied Biology.
M. P. Brooker, and R. W. Edwards.
Freshwater Biol, Vol 3, No 4, p 383-389, 1973, Illus.

Descriptors: *Reservoirs, Aquatic plants, Algae, *Plant growth regulators, *Herbicides, Algicides, *Paraquat, *Metabolism, Oxygen.
Identifiers: Filamentous algae, Macrophytic algae.

Changes in the metabolism of a reservoir, treated with paraquat to control aquatic plants, are described using data provided by a submersible O2 and temperature recorder. As a result of the herbicide-induced death of the plants, gross O2 production and the efficiency of utilization of solar radiation declined. However, the total respiratory demand also declined at this time and there was no dramatic shift in the P : R ratio (gross production : community respiration). Subsequently, O2 production and the efficiency of solar radiation increased as a result of the growth of filamentous and macrophytic algae.--Copyright 1974, Biological Abstracts, Inc.
W75-01674

PLANTS AS BIOINDICATORS OF THE CONTAMINATION OF A WATERWAY BY EFFLUENTS OF A NUCLEAR POWER STATION: ASSESSMENT OF RADIOACTIVE RELEASE OF A REACTOR (CHOOZ, FRENCH ARDENNES REGION) THROUGH AQUATIC AND RIPARIAN PLANTS OF THE RIVER MEUSE, (IN FRENCH),
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
For primary bibliographic entry see Field 5B.
W75-01675

METALS: PARTS AND THE WHOLE,
Environmental Protection Agency, Cincinnati, Ohio.
For primary bibliographic entry see Field 5B.
W75-01676

OVERVIEW OF EFFECTS OF TRACE METALS,
Illinois Univ., Urbana.
H. A. Laitinen.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio, National Environmental Research Center, Cincinnati, Ohio, p 41-44, Feb, 1973. 9 ref.

Descriptors: *Trace metals, *Pollutants, *Toxicity, Human pathology, Animal pathology, Plant pathology, Pesticides, Effluents, Industrial wastes, Municipal wastes, Leaching, Conferences.

The need for comprehensive work on both short- and long-term effects of trace metals on the total environment is stressed. Current knowledge on the source and effects of trace metals is also discussed. The trace metals can be introduced into the environment by natural and man-made distribution; the former constitutes a background level against which man-made pollution can be measured. The natural mechanisms include weathering and leaching of minerals with distribution via natural waters or airborne particulates. These are the main mechanisms of movement of trace metals. Also, volcanic action and natural gases are known to introduce substantial quantities of certain metals into the environment. The three major sources among the man-made sources are: (1) particulate matter from smoke stacks, incinerators, open fires, and open fires, and automotive exhaust; (2) liquid solutions, either industrial wastes and effluents or municipal sewage; (3) chemicals applied to the soil as pesticides. The entry of trace metals into the animal organism can be through two principal routes, ingestion of food and water or inhalation. Biological effects of tract metals can be described at these organizational levels: the organism, the organ, the cell, the organelle, the membrane, and the molecular level. (See also W74-0926)
W75-01679

EFFECTS AND DEVELOPMENT OF CRITERIA AND THE ESTABLISHMENT OF STANDARDS,
Environmental Protection Agency, Washington, D.C.
H. Wiser.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 61-62, February, 1973.

Descriptors: *Standards, Pollution, Statistical methods, Environment, Conferences.

Problems of setting pollution control standards are discussed. The effects of pollutants on man are emphasized. All studies and statistical reports submitted to the EPA are carefully studied. The threshold is selected by deciding what will protect the most people while keeping the standard of living at an acceptable level. (See also W74-09206) (Jernigan-Vanderbile)
W75-01682

HUMAN STUDIES LABORATORY,
Environmental Protection Agency, Research Triangle Park, N.C.
G. J. Love.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 67, February, 1973.

Descriptors: *Public health, *Environmental control, Toxins, Absorption, Distribution, Conferences.

Within the EPA, the Human Studies Laboratory (HSL) has been given primary responsibility for developing the health intelligence necessary for the establishment of adequate environmental quality standards. The HSL must be concerned with measurements of total intake and routes of intake as well as with absorption, distribution, storage and excretion of the individual material, and also with the entire biologic spectrum of response that may occur as a result of exposure. At present, they are forced to rely heavily on occupational data that for several reasons are less than satisfactory. However, since the need and the obligation to protect human health surmounts all other responsibilities, the HSL utilizesthe best data available to develop recommendations when they are needed, and for whatever action appears to be necessary to assure adequate protection for even the more susceptible or sensitive segments of the population. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01684

SIGNIFICANT EFFECT OF POLLUTANTS,
International Lead Zinc Research Organization, Inc., New York.
J. F. Cole.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 69-70, February, 1973.

Descriptors: *Pollutants, *Public health, *Environmental control, *Environmental effects, Trace metals, Contaminants, Conferences.

In the area of criteria establishment, one problem is to determine what is a significant effect of a given pollutant. If a definition can be provided of a significant effect then the overall problem will be reduced to monitoring and analysis. There is much controversy over what constitutes a significant effect. Some define it as any measurable change in man or the environment, while others hold that an effect is not a significant unless it produces illness in man or measurable harm to the environment. The effects on which criteria are established and set must be somewhere between these two extremes. It is recommended that criteria be based on known harmful effects, and safety factors be established with full knowledge and consideration of the economic and environmental disruption which may be caused by over-zealous action. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01685

STATEMENT ON ESTABLISHMENT OF CRITERIA FOR METALS IN FOODS,
Department of Health, Education and Welfare, Washington, D.C.
C. F. Jelinek.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 71-72, February, 1973. 3 ref.

Descriptors: *Trace metals, *Foods, *Toxicity, Diets, Human pathology, *Public health, Analytical techniques, Mercury, Freshwater fish, Marine fish, Contaminants, Conferences.

The Bureau of Foods deals with materials that enter food through natural geologic causes as well as through man's activity. It determines what level of exposure, from food, it consistent with safety. The overall level of occurrence of the toxic elements in food must be determined in order to obtain a good indication of the natural background level in food, and to find out whether specific components of the food supply contain unusually high levels, so that potential problems are readily identified. In determining the overall level of occurrence of a contaminant in the food supply, continuing surveys are concluded on the total diet, classes are analyzed. The intake of a given metal is based on the average total consumption of a young male adult, which is appreciably more than that of the average adult. A special fish survey determines the levels of contamination in a variety of sea and fresh water fish. The objective has been to use resources to concentrate on the most potentially hazardous metals first; systematically develop necessary data for quidelines, but at the same time

maintain flexibility. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01686

BIOMEDICAL RESEARCH IN SUPPORT OF CRITERIA AND STANDARDS,
National Inst. of Environmental Health Sciences, Research Triangle Park, N.C.
D. H. K. Lee.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 73-74, February, 1973.

Descriptors: *Public health, *Standards, *Research priorities, Human pathology, Research and development, Biology, Trace metals, Toxicity, Conferences.

Biomedical research is involved in establishing criteria standards for dose-response relationships. It is not always clear what should be used as the response. Easily measured reactions, such as pulse rate, may be unaffected or so influenced by extraneous factors, as to be unreliable. Sick absences have some built-in uncertainties. Subjective complaints like headache or loss of appetite are very hard to quantify. If there is strong presumptive evidence that any agent is harmful, some kind of limit must be set which will protect most, if not all, of those who may be exposed to the agent. To provide the public with the best protection that is justifiable, the following are suggested: (1) the various environmental agents be placed in some kind of rank order as regards importance, severity of effect, number of people exposed, etc.; (2) those making the judgement are permitted to do so according to their conscience, regardless of the pressures and interests of those affected; (3) funding and encouragement be given to those involved in toxicological research so that still better judgement can be made in the future. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01687

CONTROL OF PARTICULATE LEAD EMISSIONS FROM AUTOMOBILES,
Du Pont de Nemours (E. I.) and Co., Wilmington, Del.
For primary bibliographic entry see Field 5B.
W75-01691

POWER, PLANKTON, AND FIREFLY TAILS,
National Marine Water Quality Lab., West Kingston, R.I.
For primary bibliographic entry see Field 5B.
W75-01795

LIFE AND POLLUTION IN GREAT SOUTH BAY,
Offshore/Sea Development Corp., New York.
For primary bibliographic entry see Field 5B.
W75-01799

WASTEWATER DISCHARGES INTO PENSACOLA BAY, ESCAMBIA BAY AND RIVER (EXCLUDING MONSANTO, AMERICAN CYANAMID AND AIR PRODUCTS),
Environmental Protection Agency, Athens, Ga. Surveillance and Analysis Div.
For primary bibliographic entry see Field 5B.
W75-01826

MUCUS AND FRESHWATER OSMOREGULATION IN ANADROMOUS FISHES AND RELATIONSHIPS TO MORTALITIES IN THE ALEWIFE,
Wisconsin Univ., Milwaukee.
J. G. Stanley.
Available from the National Technical Information Service, Springfield, Va 22161 as COM 74-10164, $3.75 PC, $2.25 MF. Completion Report for the Period May 1970-June 1973, Sept. 1973. 25 p, 1 fig, 14 tab.

Descriptors: Fishes, *Temperature, *Diseases, *Mucus, *Mortality, Lakes, Stress(Physiology), Electrolytes, Environmental biology, Water pollution effects, Great Lakes, Lake Michigan, Lethal limit.
Identifiers: Alosa pseudoharengus, *Anadromous fishes, *Alewife, *Osmoregulation, Acute upper ethal temperature, Mass mortality, Fungus infection, Adrenal corticoids, Plasma sodium.

The alewife (Alosa pseudoharengus) tolerates 10 degree C changes in temperature and has an acute upper lethal temperature well above those normally encountered in the Great Lakes. Thermal conditions per se are unlikely to cause the mass mortality often seen in this species. Low plasma sodium levels were found associated with the moribund state and with fungal infections. A hypothesis is proposed that moderate stress causes hypersecretion of adrenal corticoids which produce high plasma sodium levels, whereas severe shocks result in exhaustion and loss of electrolyte. Exposure of to alewives to cold or warm temperatures and to lethal heat resulted in only minor changes in electrolyte levels and numbers of mucous cells. (Katz)
W75-01827

MERCURY IN SOME MARINE ORGANISMS FROM THE OSLOFJORD,
Oslo Univ. (Norway). Lab. for Marine Zoology and Marine Chemistry.
A. T. Anderson, and B. B. Neelakantan.
Norwegian Journal of Zoology, Vol 22, No 3, p 231-235, August 1974. 3 tab, 1 fig, 20 ref.

Descriptors: *Mercury, *Marine animals, Fish, *Mollusks, *Crustaceans, Heavy metals, Food chains, Path of pollutants, Methodology.
Identifiers: *Bioaccumulation, *Mytilus edulis, Pasiphea multidentata, Clupea harengus, Sprattus sprattus, Platichthys flesus, Godus morhua, Cardium edule, Cyprinia icelandia, Mya arenana, Modiolus modiolus, Buccinum undatum, Carcinus maenus, Pandalus borealis, Crangon crangon, *Norway(Oslofjord).

The concentration of mercury has been measured in six species of molluscs, in four species of crustaceans, and in four species of fish from the Oslofjord. The levels of mercury ranged from 0.29 to 0.84 mg/g d.w. for molluscs, 0.31 to 0.39 mg/g.d.w. for crustaceans, and 0.14 to 0.71 mg/g d.w. for fishes. One species, Mytilus edulis, was used to study the geographical variation of mercury within the fjord. Ther appeared to be a higher concentration of mercury in the outer fjord. Analyses of various tissues in M. edulis revealed the highest mercury concentrations in the gills. The mean value of mercury in all the species studied, however, was low compared with results from other areas. (Katz)
W75-01828

PESTICIDE LEVELS IN ESTUARINE AND MARINE FISH AND INVERTEBRATES FROM THE GUATEMALAN PACIFIC COAST,
Peace Corps-FAO Cooperative Central American Fisheries Development Program (Guatemala).
R. K. Keiser, A. A. Amado, and S. R. Murillo.
Bulletin of Marine Science, Vol 23, No 4, p 905-924, December 1973. 4 fig, 8 tab, 22 ref.

Descriptors: *Pesticides, *Fishkill, *DDD, *Pesticide residues, *DDT, *Chlorinated hydrocarbon pesticides, Marine fish, Invertebrates, Estuaries, Shrimp, Mullets, Agricultural runoff, Cotton, Lagoons, Juvenile growth stage, Commercial shellfish, Public health.
Identifiers: *Toxaphene, *Mugil ssp., *Guatemala, Dormitator latifrons, Poecilia sphenops, Tissue analysis.

Twenty-seven species of estuarine and marine fish and invertebrates were analyzed for chlorinated hydrocarbon residues from July to November 1970. In non-agricultural areas, mullet (Mugil) was the only organism to have DDT concentrations greater than 1.0 ppm and measurable levels of toxaphene. DDT levels of most organisms were higher in areas bordered by cotton fields, and 53 percent of the samples from these areas had measurable levels of toxaphene. Shrimp from all areas of the coastline had low levels of DDT. A fish kill was observed in a coastal lagoon bordered by cotton fields. In this lagoon, moribund specimens of Dormitator latifrons had DDT residue levels 7 times higher than those found in other areas. Mullet from this lagoon had average DDT levels as high as 36.6 ppm, and DDT concentrations in Poecilia sphenops in one month exceeded 45 ppm. The cotton-growing season and pesticide application coincided with the utilization of the estuaries by post larval and juvenile shrimp. Juvenile shrimp were absent from a coastal lagoon receiving agricultural runoff. Poecilia sphenops and Mugil, which comprise a substantial part of the diet of the coastal and highland peoples, consistently had high residue concentrations of DDT and toxaphene. (Katz)
W75-01829

GROWTH STIMULATION AND BIOCHEMICAL CHANGES IN JUVENILE COHO SALMON (ONCORHYNCHUS KISUTCH) EXPOSED TO BLEACHED KRAFT PULPMILL EFFLUENT FOR 200 DAYS,
British Columbia Research Council, Vancouver. Div. of Applied Biology.
D. J. McLeay, and D. A. Brown.
Journal of the Fisheries Research Board of Canada, Vol 31, No 6, p 1043-1049, 1974. 1 fig, 3 tab, 35 ref.

Descriptors: *Salmon, *Bioassay, *Pulp wastes, *Juvenile fish, *Growth rates, Biochemistry, Water pollution sources, Industrial wastes, Fish physiology, Oxygen, Stress, Resistance.
Identifiers: *Coho salmon, *Oncorhynchus kisutch, *BKME, *Sublethal effects, Blood composition, Glucose levels, LC50.

Juvenile coho salmon were exposed for 200 days to neutralized filtered bleached kraft mill effluent (BKME) at concentrations of 0.1 and 0.25 of the samples 96-h LC50 values. Fro 50 to 200 days, mean weights of fish exposed to 0.25 LC50 BKME were significantly higher than control values; those of fish in 0.1 LC50 BKME were consistently but not significantly higher than control weights. By 200 days, mean weight of fish receiving the higher BKME concentration was twice that of controls. Growth results are condidered in terms of BKME-induced behavioral changes, increased nutrient supply, effluent salinity, hormetic effects and hormonal changes. Lactate levels were elevated in the blood and muscle of coho fry exposed to the higher BKME concentration only; serum pyruvate levels were decreased in fish receiving either concentration. The serum lactic acid:pyruvic acid ratio was increased in both groups of fish, indicating oxygen debt. Plasma glucose levels were elevated in BKME-exposed fish and liver:muscle glycogen ratio was increased in both groups. Body protein content was decreased in those exposed to 0.25 LC50 effluent. The chronic stress response pattern displayed was similar to a previously proposed stage of resistance to stress for mammals. (Katz)
W75-01830

EFFECT OF PCB ON INTERSPECIFIC COMPETITION IN NATURAL AND GNOTOBIOTIC PHYTOPLANKTON COMMUNITIES IN CONTINUOUS AND BATCH CULTURES,
State Univ. of New York, Stony Brook. Marine Biology Program.
N. S. Fisher, E. J. Carpenter, C. C. Remsen, and C. F. Wurster.

Microbial Biology, Vol 1, p 39-50, 1974. 3 fig, 3 tab, 43 ref.

Descriptors: *Polychlorinated biphenyls, *Diatoms, *Competition, Algae, Phytoplankton, Pesticides, Toxicity, Toxicants, Water pollution effects, Environmental effects, Biological communities, Laboratory tests, Cultures, Methodology.
Identifiers: *Thalassiosira pseudonana, Batch cultures, Continuous cultures, Sublethal effect.

The toxicity of polychlorinated biphenyls (PCB) to the diatom Thalassiosira pseudonana, grown in pure and mixed culture, was greatest when in competition with other species. Continuous cultures were superior to batch cultures for studying competitive interactions, and PCB caused greater alteration of species composition in continuous cultures than it did in batch cultures. Natural phytoplankton communities from Vineyard Sound, maintained in continuous culture, responded to PCB stress the same as did gnotobiotic communities, with T. pseudonana showing similar responses in both communities. A PCB concentration of 0.1 mg/l (0.1 part per billion), a level not uncommon in natural waters, did not affect algal growth in pure cultures, but caused substantial disruption of continuous culture communities. The possible impact of PCB pollution on natural phytoplankton communities is discussed. (Katz)
W75-01831

ALGAL CANCER AND ITS CAUSES-I. CARCINOGENIC POTENCIES OF WATER AND SUSPENDED SOLIDS DISCHARGED TO THE RIVER OHMUTA, (IN JAPANESE),
Kyushu Univ., Fukuoka (Japan). Dept. of Fisheries Chemistry.
S. Ishio, K. Kawabe, and T. Tomiyama.
Bulletin of the Japanese Society of Scientific Fisheries, Vol 38, No 1, p 17-24, 1972. 4 fig, 2 tab, 13 ref.

Descriptors: *Algae, *Water pollution effects, *Plant diseases, *Sediments, Industrial wastes, Environmental effects, Suspended solids, Aromatic compound, Bioassay, Laboratory tests.
Identifiers: *Porphyra tenera, Carcinogens, *Japan(Ohmuta River).

A cancerous disease of Porphyra tenera was observed in the coastal waters of Toko, Nagoya and Fukuyama and in the waters along the industrial city of Ohmuta. Carcinogenic potencies were tested with the waste water taken during the ebb tide of the river Ohmuta, and also with mud deposited on the sea bottom, about 1.5 km north from the mouth of this river. The tests revealed that the waste water showed poor carcinogenic effect when diluted to a concentration as low as that found in the areas where this disease can be easily detected, but the mud induced cancers on the leaves of this alga during a 36 day culture after a single contact for periods ranging from 80 to 320 minutes. It is concluded that the cancerous disease of Porphyra tenera should be attributable to suspended solids contained in the sea bottom mud which probably is derived from the Ohmuta River as evidenced from the distribution of nitrogenous aromatic compounds in the bottom mud. (Katz)
W75-01832

MERCURY, DDT, DIELDRIN, AND PCB IN TWO SPECIES OF ODONTOCETI (CETACEA) FROM ST. LUCIA, LESSER ANTILLES,
Guelph Univ. (Ontario). Dept. of Zoology.
For primary bibliographic entry see Field 5B.
W75-01833

USE OF POWDERED ACTIVATED CARBON TO ELIMINATE ROTENONE TOXICITY IN STREAMS,
New York State Dept. of Environmental Conservation, Albany.
For primary bibliographic entry see Field 5G.
W75-01834

CONSIDERATIONS ON TESTING THE ACCUMULATION OF PESTICIDES BY MEANS OF ARTIFICIAL FOOD CHAINS,
Hamburg Univ. (West Germany). Institut fuer Hydrobiologie und Fischereiwissenschaft.
K. Lillelund.
Berichte der Deutschen Wissenschaftlichen Kommission fur Meeresforschung, Vol 23, No 3, p 308-316, 1974. 1 fig, 36 ref.

Descriptors: *Food chains, *Pesticides, *Path of pollutants, *Testing, Laboratory tests, Analytical techniques, Model studies, Pesticide kinetics, Animal physiology, Algae.
Identifiers: *Bioaccumulation, *Concentration factors, *Artificial food chain, Dunaliella, Artemia salina, Tilapia zillii, Sublethal effects.

Problems associated with the development of experimental food chains for testing pesticide accumulation are discussed. Attention is directed especially to the ways of accumulation, criteria for selecting organisms for a test chain, structure of a test chain, the basis for the calculation of and definitions for the concentration factors Cw, Cf, Ct, pesticide concentrations for test purposes, duration of tests, kinetics of accumulation, density of algae in cultures, and the physiological conditions of test organisms. As an example, the artificial food chain Dunaliella-Artemia salina-Tilapia zillii is presented. (Katz)
W75-01835

INFLUENCE OF OXYGEN CONCENTRATION ON GROWTH AND SURVIVAL OF LARVAE AND JUVENILES OF THE IDE, IDUS IDUS (L),
Lund Univ. (Sweden). Dept. of Animal Ecology.
F. Florez.
In: Fishery Board of Sweden, Institute of Freshwater Research, Drottningholm, Sweden, Report No 52, p 65-73, 1972. 4 tab, 13 ref.

Descriptors: *Temperature, *Oxygen, *Growth rates, Juvenile fish, *Mortality, Oxygen requirements, Laboratory tests, Larvae, Methodology, Lethal limits, Fish diets, Water pollution effects.
Identifiers: *Idus idus, Acclimation, Fish development.

The effect of temperature on oxygen requirements and the influence of oxygen concentration on growth at different food intake levels of Idus idus are discussed. Juveniles were found to be more resistant to a low concentration of oxygen when reared at high temperature than at low. The zone of mortality is delimited by a narrow range of oxygen concentration at all acclimation temperatures. Fish development is stimulated by greater oxygen concentrations. (Katz)
W75-01836

EFFECTS OF TRITIATED WATER ON THE EMBRYONIC DEVELOPMENT OF TWO MARINE TELEOSTS,
National Inst. of Radiological Sciences, Chiba (Japan). Div. of Environmental Health.
R. Ichikawa, and I. Suyama.
Bulletin of the Japanese Society of Scientific Fisheries, Vol 40, No 8, p 819-824, August 1974. 3 tab, 1 fig, 7 ref.

Descriptors: *Hatching, *Sea water, *Tritium, Radioisotopes, Embryonic growth stages, Larvae, Nuclear wastes, Water pollution effects, Water pollution sources, Laboratory tests, Bioassay, Marine fish, Animal physiology.
Identifiers: *Flounder, *Puffer, Paralichthys olivaceus, Fugu niphobles.

Artificially fertilized eggs of common flounder, Paralichthys olivaceus, and a species of puffer, Fugu niphobles, were reared until hatching in tritiated sea water of various concentrations. No significant difference in their hatchability was observed between control and tritiated water groups of 10 to the -8th power to 10 to the -2 power Ci/l. However, a decrease in puffer egg hatchability was observed in tritiated water at very high concentrations, i.e., 1 and 10 Ci/l. Absorbed radiation dose was calculated to be 2160 rad in 180 hours for the 1 Ci/l and 15600 rad in 130 hours for the 10 Ci/l group. The hatched larvae of the 10 Ci/l group were rather inactive, lying on the bottom of the tank, whereas the control larvae swam actively. Compared with control larvae, the 10 Ci/l larvae developed smaller stumpy-shaped bodies with swollen abdomens. Although the eye diameter of the 10 Ci/l larvae was found to be only about 57 percent of that of the controls, the body weights of both groups were nearly equal, possibly due to the larger amount of residual yolk in the 10 Ci/l larvae. These findings indicate that the morphological development of embryos reared in tritiated water of high concentration is retarded. (Katz)
W75-01837

THE HELME RESERVOIR NEAR KELBRA (KYFFHAEUSER): II. LIMNOLOGICAL AND HYGIENIC RELATIONSHIPS IN THE PERIOD ENCOMPASSING 1968-1969, (IN GERMAN),
Martin Luther-Universitaet, Halle-Wittenberg (East Germany). Hygiene Institut.
H. Heynig.
Limnologica, Vol 9, No 1, p 63-79, 1974, Illus.
Identifiers: *Algae, *Phytoplankton, *Zooplankton, *Phosphates, Branchiura, Carp, Chlorophyta, Chrysophyta, Ciliata, Cladocera, Copepoda, Cyanophyta, Euglenophyta, *Eutrophication, Limnological studies, Pyrrophyta, Reservoirs, Rotifera, Water pollution effects, *East Germany(Helme Reservoir), Hygiene, Public health.

A high degree of waste water pollution, a high phosphate content, eutrophication, and algae and hydrophilous plants were evident at the dam. Because the water contained many carp, it was judged fit for human bathing. The phytoplankton found included Cyanophyta, Chrysophyta, Chlorophyta, Euglenophyta and Pyrrophyta. The zooplankton included members of Ciliata, Rotatoria (Rotifera), Cladocera, Copepoda and Branchiura.--Copyright 1974, Biological Abstracts, Inc.
W75-01839

A STUDY OF THE EFFECTS OF SECONDARY EFFLUENT ON WAIMANO AND WAIAWA STREAMS,
Hawaii Univ., Honolulu. Water Resources Research Center.
S. S. Aoyama, and R. H. F. Young.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 857, $4.25 in paper copy, $2.25 in microfiche. Technical Report No 76, May 1974. 49 p, 31 fig, 8 tab, 21 ref. OWRT A-027-HI(3). 14-31-0001-3811.

Descriptors: *Hawaii, *Chlorination, *Water pollution effects, *Color, *Odor, *Sewage effluents, Drainage, Water quality, Nutrients, Water quality standards, Chemical analysis, Water pollution sources.
Identifiers: Waimano Stream(HI), Waiawa Stream(HI).

A field study was made between September 1972 to May 1973 to assess the water quality changes in Waiawa and Waimano Streams, particularly the effect of chlorinated effluent from the Pacific Palisades Sewage Treatment Plant on the receiving stream waters. Some changes were very apparent, especially those of an aesthetic nature, the visible change in the color and turbidity of the water and the sulfurous odor of septic sewage. These obvious changes were indications of changes in water quality which could only be determined in the laboratory by chemical analysis. The actual degree

of change in stream quality and amount of recovery cannot be determined until Palisades Treatment Plant ceases operation, and sewage effluent is no longer discharged into the stream. Waiawa Stream is an intermittent stream with a large drainage area. The developed areas within the Waiawa basin represent 20-25 percent of the total drainage area, but the sewage flow from one such developed area, Pacific Palisades, is the source of perennial flow for the lower section of Waiawa Stream. However, even with the large drainage area and intermittent streamflow, self-purification takes place in the short distance from the point of sewage effluent discharge to Pearl Harbor.
W75-01854

THE ROLE OF MICROORGANISMS IN MARINE FOULING,
Stanford Univ., Calif. Dept. of Civil Engineering.
L. Y. Young, and R. Mitchell.
International Biodeterioration Bulletin, Vol 9, No 4, p 105-109, 1973. 4 fig, 20 ref.

Descriptors: *Microorganisms, *Fouling, *Laboratory tests, On-site investigations, Larvae, Microbiology, Pollution abatement, *Water pollution effects, Organic compounds, Oysters.
Identifiers: *Oyster larvae.

Differences in the microbiological film appear to be detected by oyster larvae Crassostrea virginica. In laboratory studies attachments to surfaces varied depending on the nature of the microbial film. Field tests appear to indicate that the number of animals which attach to a surface is proportional to the number of bacterial composing the primary film. Tests carried out in two markedly different locations indicate the same trend occurring but over different periods of time. The pristine environment required three times as long for the development of the same degree of fouling as the nutrient rich environment. Oyster larvae display three characteristic patterns toward a variety of organic compounds and microorganisms: positive, neutral-active and inactive, and negative chemotaxis. It was suggested that control of microbial and macrobiological fouling be considered from the aspect of altering the interaction between the larvae and the microbial population on the surface. (Sandoski-FIRL)
W75-01869

CHANGE OF THE CYCLE OF INORGANIC MATTER IN NATURE (DIE VERANDERUNGEN DER MINERALSTOFFKREISLAUFE IN DER NATUR),
Technische Hochschule, Vienna (Austria). Institut fuer Verfahrenstechnik und Technologie der Brennstoffe.
For primary bibliographic entry see Field 5B.
W75-01870

MASS SPECTROMETRIC IDENTIFICATION AND DETERMINATION OF ORGANOCHLORINE HYDROCARBONS IS FISH (MASSENSPEKTROMETRISHE IDENTIFIZIERUNG UND QUANTIFIZIERUNG VON CHLORKOHLENWASSER STOFFEN IN FISCH),
Institut fuer Meeresforschung, Bremerhaven (West Germany).
For primary bibliographic entry see Field 5A.
W75-01874

EFFECTS OF CHRONIC DIETARY NITRATES ON CANINE THYROID FUNCTION,
Kansas State Univ., Manhattan. Coll. of Veterinary Medicine.
S. T. Kelley, F. W. Oehme, and S. B. Hoffman.
Toxicology and Applied Pharmacology, Vol 27, No 2, p 200-203, January, 1974. 2 tab, 20 ref.

Descriptors: *Nitrates, *Toxicity, Investigations, Rural areas, Water quality, Lethal limits.
Identifiers: *Dietary effects, *Canines, *Thyroids, Beagles.

Potentially toxic levels of nitrate in the water of rural areas has been recognized. The effects of dietary nitrate on thyroid function in beagle dogs and their offspring were investigated. The dogs received 0 ppm, 600 ppm or 1000 ppm sodium nitrate in drinking water under normal management and feeding conditions. Continuous consumption of these sublethal levels of nitrate did not produce a syndrome of chronic nitrate toxicosis characterized by thyroid dysfunction. (Prague-FIRL)
W75-01877

AMMONIA DETOXIFYING MECHANISMS OF RAINBOW TROUT ALTERED BY DIETARY DIELDRIN,
Missouri Univ., Columbia. Fish-Pesticide Research Lab.
P. M. Mehrle, and R. A. Bloomfield.
Toxicology and Applied Pharmacology, Vol27, No 2, p 355-365, February, 1974. 3 fig, 2 tab, 18 ref.

Descriptors: *Ammonia, Aquatic environment, *Amino acids, *Rainbow trout, *Dieldrin, Pollution, Electron microscopy, Fish, Enzymes, Water pollution effects.
Identifiers: *Detoxification, Dietary effects, Brain concentrations, Liver cells.

Ammonia is one of the most common toxicants discharged into the aquatic environment. Ammonia detoxifying mechanisms and brain amino acid metabolism of rainbow trout were altered by dietary dieldrin dosages of 14, 43, 143, and 430 micrograms/kg body weight per day for 240 days. Whole-body dieldrin residues in fish from the lowest three dosage groups were comparable to those found in fish from the aquatic environment. The brain concentrations of amino associated with ammonia detoxifying mechanisms, asparate, glutamate and alanine, were significantly altered, as were the enzymes related to metabolism. Brain ammonia concentrations increased in the groups given the two highest dosages. Mitochondrial morphology in liver cells was significantly altered by dieldrin treatment as determined by electron microscopy. The ammonia detoxifying mechanisms of fish seemed to be very sensitive to dieldrin; the 'no-effect' dosage was below 14 mocrograms/kg body weight per day. Results indicated that fish carrying body burdens of dieldrin would be less tolerant to increased concentrations of ammonia in water. Subtle biochemical effects of dieldrin influence the adaptability and survival of rainbow trout in their aquatic environment. (Prague-FIRL)
W75-01880

MORTALITY RATE FROM CARDIOVASCULAR DISEASES AND WATER HARDNESS, (IN RUSSIAN),
Central Inst. of Postgraduate Medicine, Moscow (USSR).
F. G. Krotkov.
Gig Sanit, Vol 38, No 4, p 69-73, 1973.
Identifiers: Animal mortality, *Cardiovascular diseases, Human mortality, Trace elements, *Water hardness, *Mortality rate.

A review of the literature which indicates that the mortality rate among the population constantly using hard water is relatively lower than in regions with soft water is presented. The cause of this phenomenon is still insufficiently studied, but there are grounds to assume that the level of water hardness is an indicator of the presence or absence of some factor affecting the development of cardiovascular diseases. Most investigators are inclined to think that this role is played by trace elements which are always present in large quantities in hard water. The fact that drinking water is by no means the sole or even the main supplier of trace elements is stressed. Plant and animal food products unquestionably play a more important role in this case, but concrete data on this important matter for hygienists are not given in publications of the WHO and International Atomic Energy Agency.--Copyright 1974, Biological Abstracts, Inc.
W75-01899

NEW FINDINGS ON THE TOXICITY OF ENDOSULFAN AND ITS METABOLITES TO AQUATIC ORGANISMS,
Farbwerke Hoechst AG, Frankfurt am Main (West Germany).
W. Knauf, and E.-F. Schulze.
Meded Fac Landbouwwet Rijksuniv Gent, Vol 38, No 3, p 717-732, 1973, Illus.
Identifiers: Aedes-aegypti, *Aquatic organism, Artemia-salina, Carassius-auratus, Chironomus-thummi, Chlorella-vulgaris, Daphnia-magna, *Endosulfan, Idus-melanotus, Lebistes-reticulatus, Lethal limit, Lymnaea-stagnalis, *Metabolites, Physa-fontinalis, Planorbis-corneus, Reproduction, *Toxicity, Tubifex-tubifex, Water pollution effects.

The LC 50 (median lethal concentrations, 48 h) of endosulfan alpha, endosulfan beta, endosulfan 35 EC (Thiodan), endosulfan sulfate, endosulfan alcohol, endosulfan ether, endosulfan hydroxyether and endosulfan lactone to 11 aquatic organisms (Carassius auratus, Lebistes reticulatus, Idus melanotus, Chironomus thummi, Aedes aegypti, Daphnia magna, Artemia salina, Lymnaea stagnalis, Physa fontinalis, Planorbis corneus, Tubifex tubifex were determined. The effect on fish is lost by removing the sulfur in the molecule. After that the effect on fish is in the same range as on the other invertebrates (LC 50:1-10 ppm). The 1st impact of endosulfan to Chlorella vulgaris is observed in concentrations of > 2 ppm (reproduction rate), noticable at 50 ppm (reducing the speed of reproduction). After 5 days of contamination this effect is fully reversible. In concentrations around 0.01 ppm all substances show no effects on reproduction rate, photosynthesis and biomass-production of this algae.--Copyright 1974, Biological Abstracts, Inc.
W75-01900

ENVIRONMENTAL IMPACT OF LAND USE ON WATER QUALITY: A WORK PLAN. BLACK CREEK STUDY, MAUMEE RIVER BASIN, ALLEN COUNTY, INDIANA. PLANNING PHASE. WORK PLAN. REDUCTION OF SEDIMENT AND RELATED POLLUTANTS IN THE MAUMEE RIVER AND LAKE ERIE.
Allen County Soil and Water Conservation District, Fort Wayne, Ind.
Available from the National Technical Information Service, Springfield, Va. 22161 as PB-227 112, $5.25 in paper copy, $2.25 in microfiche. Prepared for Environmental Protection Agency, U.S. Department of Agriculture, Purdue University, and Allen County Council, May, 1973. 101 p, 14 fig, 13 tab, 2 append.

Descriptors: *Land use, *Water quality, *Environmental effects, *Demonstration watersheds, Watersheds, Soil types, Sediment load, Monitoring, Erosion control, Sedimentation, Planning, Scheduling, *Indiana, Illinois.
Identifiers: *Maumee River Basin(Ind), *Black Creek Watershed(Ind), Allen County(Ind), Land treatment measures, Incentives.

An investigation of the Maumee Basin was conducted to determine physical, geographic, and socio-economic characteristics which would be necessary to conduct a meaningful demonstration and research project on a small watershed. Black Creek Watershed in Allen County Indiana was selected. The result of this study is a description of the area in terms of soil type and land use capabilities which has allowed specialists to predict by volume types of land treatment measures which will significantly reduce sediment contribution

from this watershed to the Maumee River. Monitoring sites were selected within the watershed and a plan of investigation which will lead to an extrapolation of results of the demonstration project to the basin was developed. Extrapolation will be based on data on: (1) relative success of various existing erosion control techniques in improving water quality, (2) effect of various land use and agricultural practices on erosion and the resulting effect on sedimentation and water quality, and (3) types of incentives that will convince individual land-owners to voluntarily participate in erosion control programs. A work schedule for treatment was developed and included as a supplement to the final report on the 6-month planning phase, identifying specific areas of concern, the proposed research effort, and the results to be expected. (Diefendorf-North Carolina)
W75-01930

TOXICITY AND TEMPORAL CHANGES IN CONCENTRATION OF THE INSECTICIDE PARATHION IN WATER, (IN GERMAN),
Bundesgesundheitsamt, Berlin (West Germany). Institut fuer Wasser-, Boden-, und Lufthygiene.
D. Luedemann, and F. Herzel.
Z Angew Zool. Vol 60, No 2, p 177-181, 1973, Illus, English summary.
Identifiers: Aquariums, Guppy, Insecticides, Lebistes-reticulatus, *Parathion, *Temporal changes, *Toxicity, Water pollution effects.

The decrease of parathion content in a number of different test waters in aerated and nonaerated glass aquariums over a period of 96 h and the behavior of test animals (guppies, hebistes reticulatus) during this period were determined. Observations were based upon 4 different initial concentrations of the insecticide between 0.8 and 16 micrograms/liter of water. The decrease of concentration of the active substance was accelerated by aeration of the aquariums and by the presence of fish in them. At parathion concentrations exceeding 5 micrograms/liter, clear damage to fish was observed. Some of the animals died before the test period was 1/2 over; a more or less pronounced disorder of the state of health, could be clearly observed in all the fish.--Copyright 1974, Biological Abstracts, Inc.
W75-01943

ACCUMULATION OF HEAVY METAL IN SHELLFISH: 1. ON THE COPPER CONTENT IN GREEN OYSTERS, (IN KOREAN),
Kunsan Fisheries Junior Technical Coll. (Republic of Korea).
Y. K. Cho, and C. K. Kim.
Bull Korean Fish Soc. Vol 4, No 2, p 61-65. 1971 Illus. (English summary).
Identifiers: *Copper, Industrial wastes, Korea, *Oysters(Green), *Shellfish, Wastes, Water pollution effects, *Absorption, Heavy metals.

Shellfish absorb and accumulate heavy metals in the water environment. The relationship between the abnormal accumulation of heavy metals and the industrial wastewaters containing them is examined. The mean value of the Cu contents in the meat of oysters caught at the sampling station in the Changhang Bay area (Korea) was 851.5-143.1 mg Cu/kg wet weight. That of the Daechun area, where the oysters were not influenced by the water of the Kum River, was 13.0-27.4 mg Cu/kg wet base. The significance of the difference is 0.1%. One of the environmental factors causing Cu to be concentrated in the oysters of the Changhang area is discharges from the Changhang Ore Refinery. The absorption and accumulation mechanism of the heavy metals is discussed.--Copyright 1974, Biological Abstracts, Inc.
W75-01956

DEFINITION OF PROCEDURES FOR STUDY OF RIVER POLLUTION BY NON-POINT URBAN SOURCES,
Massachusetts Univ., Amherst. Water Resources Research Center.
For primary bibliographic entry see Field 5B.
W75-01959

CARDIOVASCULAR MORTALITY, MUNICIPAL WATER, AND CORROSION,
For primary bibliographic entry see Field 5B.
W75-01978

HEATED EFFLUENTS AND EFFECTS ON AQUATIC LIFE WITH EMPHASIS ON FISHES, A BIBLIOGRAPHY,
Ichthyological Associates, Ithaca, N.Y.
E. C. Raney, B. W. Menzel, and E. C. Weller.
Available from the National Technical Information Service, Springfield, Va. 22161 as TID-3918, $13.60 in paper copy, $2.25 in microfiche. Bulletin No 9, (1973), 651 p.

Descriptors: *Heated water, *Thermal pollution, *Aquatic life, *Bibliographies, *Indexing, Fish, Documentation, Information retrieval, Publications, Freshwater, Estuaries, Effluents, Industrial wastes.
Identifiers: *Author index, Title index, Computer system.

This bibliography regarding heated effluents and effects on aquatic life with emphasis on fishes is the fourth in the series. The report was composed and/or indexed by computer programs forming a part of the Oak Ridge Computerized Hierarchical Information System (ORCHIS). 4099 references are listed. The bibliography also includes a permutated title index and author index. (Katz)
W75-02004

THE EFFECT OF MUNICIPAL AND FOREST INDUSTRY EFFLUENTS UPON ALGAE PRODUCTION AND THE PRIMARY PRODUCTION ABILITY OF PLANKTON,
Finnish Pulp and Paper Research Inst., Helsinki.
O. Seppovara, and S. Numminen.
Paperi ja Puu (Papper och Tra), Vol 56, No 6, p 523-530, June 1974. 8 fig, 3 tab, 9 ref.

Descriptors: Biomass, *Algae, Water pollution effects, Water pollution sources, *Pulp wastes, *Municipal wastes, Sewage treatment, Plankton, Aquatic life, *Sulfite liquors, Industrial wastes, *Toxicity, Waste dilution, Effluents, Bioassay, Biological treatment, Photosynthesis, Eutrophication, Inhibition, Inhibitors, Aquatic productivity, *Primary productivity.
Identifiers: Kraft mills, Sulfite mills, Paper mills, Broad mills.

Effluents from kraft and sulfite pulp, paper, and paperboard mills and biologically treated municipal wastes were diluted to various concentrations with oligotrophic (nutrient-poor) brown lake water, and studied by the biomass titer method for their effects on the production of a green alga (Ankistrodesmus falcatus) and of natural plankta. Individual effluents were diluted to 0.1, 1, 2, 5, 10, 25, 50, 75, and 100%, while effluent mixtures were diluted to 0.1, 1, 5, 10, and 50% concentrations to give 14 experimental series and 310 biomass titers. Statistical analysis of results showed that kraft and sulfite mill effluents were mostly inhibitive, while paper and board mill effluents caused a growth of biomass in the dilutions common in industrial practice. Plankton-limiting effects appeared in kraft and sulfite effluents at 15% concentration and in paper mill effluents at 65% concentration. The sulfite pulp effluent was more inhibitive than the kraft pulp effluent. Maximum production was reached at 5 to 50% concentrations of all effluents. The municipal effluent's effect was 15 times that of the sulfite, 10 times that of the kraft and paper, and slightly below 4 times that of the board mill effluent. All mixtures in which municipal waste predominated induced algae production, but 5:1 to 50:1 blends of forest industry/municipal effluents (as are common in practice) all showed inhibitive effects. In laboratory flasks, in which plankta were exposed to a 3:1 mixture of kraft mill and municipal effluents (diluted with lake water to 0.1, 5, and 10%), the lowest concentration induced eutrophication after the first 4 critical days, and the two higher concentrations were inhibitive. Increases in effluent concentrations limited the amount of autotrophic photosynthesis organisms in primary production determinations. (Brown-IPC)
W75-02014

SHORT-TERM BIOASSAYS OF LOW-O2-CONTENT EFFLUENTS,
G. Ozburn, J. Kraft, and L. Somppi.
Pulp and Paper Magazine of Canada, Vol 75, No 9, p 74 (Technical Paper T318), Sept. 1974. 6 ref.

Descriptors: Fish, *Toxicity, *Bioassay, *Water pollution effects, *Pulp wastes, Oxygen, *Dissolved oxygenation, Effluents, Toxins, Poisons.

An inexpensive method for testing the toxicity of industrial effluents to fish is described which requires only a pressurized oxygen supply, a dissolved-oxygen meter, a water bath, and clear polyethylene bags of 10-liter capacity. The bags are filled with oxygenated water (5 liter) to which the test fish (5 individuals) and the effluent sample are added, and are then gently inflated before being suspended in the water bath for 96 hr with periodic removal of dead fish for determinations of LC50. The procedure minimizes the stripping of volatile toxins, as may happen when a bubble aerator is used. (Brown-IPC)
W75-02041

MERCURY DISTRIBUTION IN AMERICAN SMELT FROM LAKE MICHIGAN,
Univ. Wis.-Parkside, Kenosha, Sci. Div.
For primary bibliographic entry see Field 5B.
W75-02043

MERCURY CONCENTRATIONS IN FISH FROM THE GREAT SMOKY MOUNTAINS NATIONAL PARK,
Oak Ridge National Lab., Tenn.
J. W. Huckabee, C. Feldman, and Y. Talmi.
Analytica Chimica Acta, Vol 70, No 1, p 41-47, May 1974. 2 tab, 29 ref.

Descriptors: *Mercury, *Trace elements, *Water pollution effects, *Fish, Rainbow trout, Brook trout, On-site data collections, Spectroscopy, *Pollutant identification.
Identifiers: *Great Smoky Mountains National Park, *Methylmercury.

Excessive mercury concentrations ostensibly due to pollution were widely reported in fish tissue. A collection for mercury analysis of 198 fish of five species was made in 1972 in three high altitude streams in the Great Smoky Mountains, 20-25 km from the nearest pollution source. Mercury concentrations were (means, ppm): rainbow trout (Salmo gairdneri), 0.036; brook trout (Salvelinus fontinalis), 0.018, banded sculpin (Cottus carolinae), 0.025; rosyside dace (Clinostomus funduloides), 0.044; stoneroller (Campostoma anomalum), 0.039. There was no significant difference in mercury concentration among fish analyzed as a whole, with gastrointestinal tract removed, or a strip of axial musculature. There was a significant (P greater than 0.05) difference in mercury concentration among species in one stream and in three species from different streams. A second collection of fish of the same species in 1973 verified the 1972 results. Methylmercury constituted 93 plus or minus 2.6% of total mercury. The results indicated that all fish acquire about the

same tissue concentrations of mercury at chronic exposure to very low levels. (Jernigan-Vanderbilt)
W75-02061

INVESTIGATIONS OF THE FAUNA OF THE LITTORAL ZONE OF THE EUTROPHIC SEMPACHERSEE, (IN GERMAN),
P. Perret.
Schweiz Z Hydrol. Vol 35, No 1, p 69-113, 1973, Illus, English summary.
Identifiers: Animals, *Eutrophication, Fauna, Lakes, *Littoral zone, Nitrates, Nitrogen, Oxygen, Production, *Switzerland(Sempachersee), Vegetation, Oligomictic.

Between 1967 and 1969 monthly chemical and physical tests were carried out in the pelagic layer of the Sempachersee (Switzerland) (mean depth 46 m, lake surface 14.4 sq km, greatest depth 86.5 m). The fauna along the shore (shoreline 18.5 km) was examined. The Sempachersee is facultatively oligomictic. Visibility according to Secchi varies between 1.3 m and 12.9 m. At the end of the summer O2 dwindles to 4 mg O2/l in the metalimnion. At the same time the O2 concentration on the lake floor drops to values below 1 mg O2/l. During turnover nitrate-nitrogen is found in quantities of between 0.55 mg/l and 0.6 mg/l in all layers of the lake. During the production period phosphate-phosphorus is used up in the trophogenic zone and can be found in quantities of 20-24 microgram/l in all layers of the lake during turnover. The bank of the shore, which has only very sparse vegetation is 20 m wide on an average. The variety of animal species as well as the number of individuals in each are limited.--Copyright 1974, Biological Abstracts, Inc.
W75-02062

BACTERIAL GRADIENTS AT THE SEDIMENT: WATER INTERFACE OF SHALLOW LAKES,
Magyar Tudomanyos Akademia, Tihany. Biological Research Inst.
For primary bibliographic entry see Field 5B.
W75-02065

IDENTIFICATION OF METALS IN LUNG FROM A PATIENT WITH INTERSTITIAL PNEUMONIA,
Medical Coll. of Wisconsin, Milwaukee. Dept. of Anatomy.
For primary bibliographic entry see Field 5A.
W75-02066

NUTRITIONAL INFLUENCES ON THE TOXICITY OF ENVIRONMENTAL POLLUTANTS,
Environmental Health Consultation Service, Ojai, Calif.
R. A. Shakman.
Archives of Environmental Health, Vol 28, No 2, p 105-113, February 1974. 1 tab, 75 ref.

Descriptors: *Review, *Pollutants, *Toxicity, *Nutrient requirements, *Public health, Trace elements, Vitamins, Pesticides, Air pollution, Proteins, Laboratory animals, Rodents, Diets, Chromium, Cadmium, Zinc, Lead, Mercury, Silver, Manganese, Copper, Public health.

Nutritional influences on the health effects of environmental pollutants were reviewed and the interactions explained. The environmental pollutants studied included pesticides, trace minerals, and oxidant air pollution. The nutritional factors of importance in the interactions were dietary protein, especially sulfur-containing amino acids, trace minerals, and vitamins A, C, D, and E. Agricultural and geographical factors and food processing procedures affected the interactions. Pathophysiological mechanisms seemed to exist that suggest that common air pollutants and pesticides may act in a combined or synergistic fashion to pose an even greater threat to human health than has been recognized. (Jernigan-Vanderbilt)
W75-02068

THE TOXICITY OF THREE MERCURIALS TO PTERONARCYS CALIFORNICA NEWPORT, AND SOME POSSIBLE PHYSIOLOGICAL EFFECTS WHICH INFLUENCE THE TOXICITIES,
Utah Univ., Salt Lake City. Dept. of Biology.
J. A. Elder, and A. R. Gaufin.
Environmental Research, Vol 7, No 2, p 169-175, April 1974. 1 fig, 2 tab, 19 ref. EPA Fellowship (SP2-WP242-04).

Descriptors: *Mercury, *Toxicity, *Aquatic insects, Invertebrates, Organic compounds, Laboratory tests, Stoneflies, Bioassay, Water pollution effects.
Identifiers: Pteronarcys californica.

Little information is available on the toxicity of mercurials to aquatic insects. The information that is available is confined to field observations or median tolerance limit (TLm) values using only one form of mercury. The TLm values were determined for three different forms of mercury (phenylmercuric-, and methylmercuric-, and mercuric chloride) to the stonefly Pteronarcys californica. The order of toxicity of the three forms was found to be phenylmercuric chloride > methylmercuric chloride > mercuric chloride. The in vivo effect of the three forms of mercury on isolated gylceraldehyde-3-phosphate-dehydrogenase was also measured. Two possible physiological factors involve in determining the toxicity of mercury (or other metals) to aquatic insects may be the catabolic pathways being employed at any period during the year, particularly during periods of molting, and age of the instar. (Jernigan-Vanderbilt)
W75-02069

ULTRASTRUCTURAL CHANGES IN THE LIVER AFTER LONG-TERM DIET OF MERCURY-CONTAMINATED TUNA,
Wisconsin Univ., Madison. Dept. of Pathology.
L. W. Chang, and S. Yamaguchi.
Environmental Research, Vol 7, No 2, p 133-148, April 1974. 12 fig, 47 ref.

Descriptors: *Mercury, *Diets, *Toxicity, *Public health, Animal pathology, Laboratory animals, Mammals, Testing procedures, Electron microscopy, Cytological studies, Marine fish, Growth rates.

Young kittens were fed daily with contaminated tuna (containing 0.3-0.5 ppm mercury). Neurological disturbances could be observed after 7-11 mo. Electron microscopic examination revealed extensive proliferation of the smooth endoplasmic reticulum and dilatation of the rough endoplasmic reticulum suggesting active detoxification attempt of the liver. Floccular degeneration of the hepatic mitochondria was also observed. Mitochondria lost their normal matrical density, cristae, and inner limiting membrane to become single membrane-bound floccular bodies. Some of these floccular bodies were found to be extruded into the sinusoidal space and engulfed by Kupffer cells. Enlargement of the intramitochondrial granules and areas of focal cytoplasmic degradation were also observed in many hepatocytes. Vacuolar degeneration of the mitochondria in the Kupffer cells was also noted. (Jernigan-Vanderbilt)
W75-02070

MANGANESE POISONING: CLINICAL AND BIOCHEMICAL OBSERVATIONS,
Lucknow and Manganese Ore India Ltd., Nagpur (India). Industrial Toxicology Research Centre.
S. V. Chandra, P. K. Seth, and J. K. Mankeshwar.
Environmental Research, Vol 7, No 3, p 374-380, June, 1974. 3 tab, 2 fig, 19 ref.

Descriptors: *Manganese, *Public health, *Human physiology, *Biochemistry, Human pathology, *Toxicity, Calcium, Phosphates, Inorganic compounds, Testing procedures.

Clinical and biochemical studies were conducted in twelve cases of suspected manganese poisoning. On the basis of neurological observations they were divided into three grades of poisoning, mild, moderate and severe. A significant increase in serum calcium and adenosine deaminase levels was observed in cases of mild and moderate grades of poisoning, respectively. In a case of severe poisoning the increase in serum calcium was twofold and that of adenosine deaminase threefold that in normal volunteers. Serum inorganic phosphates, alkaline phosphatase and proteins were not altered. No relationship could be established between the period of exposure to manganese and severity of poisoning. The mechanism of hypercalcemia and increase in adenosine deaminase in serum has been discussed. It is suggested that serum calcium levels could be of great significance in detecting manganese poisoning in its early stages. Significant changes in adenosine deaminase levels did not appear until moderate poisoning occurred. (Jernigan-Vanderbilt)
W75-02073

ORGANOCHLORINE RESIDUES, MERCURY, COPPER AND CADMIUM IN YELLOW PERCH, WHITE BASS, AND SMALLMOUTH BASS, LONG POINT BAY, LAKE ERIE,
Canada Centre for Inland Waters, Burlington (Ontario).
J. R. M. Kelso, and R. Frank.
Transactions of the American Fisheries Society, Vol 103, No 3, p 577-581, July 1974. 1 tab, 2 fig, 16 ref.

Descriptors: *Mercury, *Copper, *Cadmium, Fish, Perch, Bass, *Lake Erie, Pesticides, On-site data collections, Toxicity, Heavy metals, Water pollution, Organic compounds, Spectroscopy, Distribution, *Pesticide residues, Pollutant identification.
Identifiers: *Organochlorine wastes.

Three collections of yellow perch, white bass and smallmouth bass were made in May, July and late October for analyses of DDT, PCB, mercury, copper and cadmium. Fat content varied seasonally among collections, lowest in spring and highest in fall. Total DDT residues were low for all species. Means ranged from 0.09 to 0.27 micrograms/g and exhibited no seasonal changes. No difference among species existed for DDT in spite of differing fat content, but concentrations within a species increased with increasing fat and subsequently age. PCB's were up to 6.5 times greater than DDT levels. PCB residues, lowest in yellow perch and highest in white bass, did not vary with season but increased with increasing fat. Dieldrin was low and no trends relating to season or fat were apparent. Only two specimens contained mercury residues above 0.5 micrograms/g. Mercury was apparently related to size and subsequently age. Copper was slightly higher in yellow perch, means ranged from 1.29 to 1.56 micrograms/g, but copper and cadmium were low in all species. (Jernigan-Vanderbilt)
W75-02082

NEUTRON ACTIVATION ANALYSIS MEASUREMENTS OF HG, SE AND ZN LEVELS IN ALBACORE AND DOLPHINS,
California Univ., Irvine.
For primary bibliographic entry see Field 5A.
W75-02086

MERGAMMA DB AND PHENYLMERCURIC ACETATE: THEIR EFFECT ON THE REPRODUCTION OF JAPANESE QUAIL (COTURNIX COTURNIX JAPONICA TEMMINCK AND SCHLEGEL),
Saskatchewan Univ., Regina. Dept. of Biology.
L. W. Dwernychuk, D. H. Sheppard, and L. E. Haley.
Canadian Journal of Zoology, Vol 52, No 2, p 291-300, February, 1974. 2 tab, 4 fig, 17 ref.

Descriptors: *Mercury, *Fungicides, *Birds, *Reproduction, Insecticides, Animal pathology, Laboratory animals, Laboratory tests, Toxicity, Water pollution effects.
Identifiers: *Phenylmercuric acetate, *Sublethal effects, *Japanese quail.

A commercial seed fungicide-insecticide, Mergamma DB, and one of its constituents, phenylmercuric acetate, were fed to Japanese quail (Coturnix coturnix japonica) in the laboratory. Five levels of mercury (1.25, 2.50, 12.50, 25.00, and 50.00 ppm) mixed with laying meal were fed to birds during four 16-week experiments. Survival of female quail, egg production, and egg weight were significantly reduced at 50 ppm mercury (Mergamma DB as mercury source). Fertility, embryo viability, and hatchability were each significantly reduced at levels of 12.5 ppm mercury for both mercury compounds. Results showed that the Mergamma DB treatments produced more pronounced reproductive failure than phenylmercuric acetate. Breast muscle from treated birds and egg contents contained significantly higher levels of mercury residue than in control birds, up to a maximum of 8.9 ppm in tissue and 2.3 ppm in eggs. Accumulation of mercury in male birds may have contributed to the significant decline in fertility of treated birds. Possible serious environmental implications of mercury seed treatments are discussed. (Jernigan-Vanderbilt)
W75-02092

SEASONAL CHANGE OF THE ORGANIC CARBON CONTENT OF LAKE BALATON DURING 1972,
Magyar Tudomanyos Akamedia, Tihany. Biological Research Inst.
For primary bibliographic entry see Field 5B.
W75-02093

INFLUENCE OF ETHANOL INGESTION ON LEAD TOXICITY IN RATS FED ISOCALORIC DIETS,
North Carolina Univ., Chapel Hill. Dept. of Pathology.
K. R. Mahaffey, R. A. Goyer, and M. H. Wilson.
Archives of Environmental Health, Vol 28, No 4, p 217-222, April, 1974. 3 fig, 5 tab, 27 ref.

Descriptors: *Alcohols, *Lead, *Toxicity, *Rats, *Diets, Laboratory analysis, Laboratory tests, Testing procedures, Public health, Human pathology, Calcium, Iron, Industries, Animal physiology, Electron microscopy.
Identifiers: Ingestion.

The effect of ethanol ingestion on susceptibility to lead toxicity under conditions of controlled nutrient intake was studied. It was concluded that the synergistic effect of alcohol on lead toxicity is slight when compared to the influence of previously studied nutritional factors such as calcium and iron. Ethanol with lead did result in substantially higher lead levels in the kidney but lesser increases in blood, liver and bone. Ultrastructural changes in hepatic cells, specifically fat droplets and mitochondrial enlargement were direct effects of ethanol ingestion and did not seem to be influenced by lead. It was suggested that the clinically suspected synergism between alcohol consumption and lead poisoning sometimes observed among industrial workmen is more likely due to nutritional factors than mutual enhancement of the closely related cellular effects of these two toxins. (Jernigan-Vanderbilt)
W75-02094

PHYTOCHROME STABILITY IN VITRO - I, EFFECT OF METAL IONS,
Reading Univ. (England). Philip Lyte Memorial Research Lab.
S. G. Lisansky, and A. W. Galston.
Plant Physiology, Vol 53, No 3, p 352-359, March, 1974. 8 fig, 1 tab, 29 ref.

Descriptors: *Heavy metals, *Plant growth, *Plant physiology, Chemical degradation, Mercury, Cadmium, Copper, Zinc, Aluminum, Cobalt, Laboratory tests, Analytical techniques, Volumetric analysis.

Photoreversible phytochrome disappeared from etiolated tissue upon actinic irradiation. Such disappearance, of possible physiological importance, involved several processes, at least one of which was accelerated by metals in vivo. Purified phytochrome from oat (Avena sativa L. ev. Garry) coleoptiles was greatly stabilized in vitro by scrupulous removal of metal impurities via chelating agents. Such stabilized phytochrome decayed rapidly upon the addition of about 10 micro-M Hg(2+), Cd(2+), Cu(2+), Zn(2+), all of which probably act on sulfhydryl groups. Other tested metals and growth factors were much less active or inactive. The metals effective in promoting decay did not affect the Pfr to Pr reversion process. This supports other evidence indicating the possible physiological importance of phytochrome 'decay'. (Jernigan-Vanderbilt)
W75-02096

CADMIUM IN THE ENVIRONMENT: AN ANNOTATED BIBLIOGRAPHY,
Oak Ridge National Lab., Tenn. Environmental Information Systems Office.
For primary bibliographic entry see Field 5B.
W75-02102

THE LOCOMOTOR RESPONSE OF GOLDFISH TO A STEEP GRADIENT OF COPPER IONS,
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Environmental Studies.
G. F. Westlake, H. Kleerekoper, and J. Matis.
Water Resources Research, Vol 10, No 1, p 103-105, February, 1974. 2 fig, 17 ref.

Descriptors: *Copper, *Fish, *Animal physiology, Toxicity, Laboratory tests, Pollutants, Testing procedures, Laboratory animals, Water pollution effects.
Identifiers: *Goldfish, *Sublethal effects.

The intent was to verify whether the previously observed attraction of goldfish to a sublethal concentration of copper ions presented in a shallow gradient also occurs when the fish are confronted with a steep gradient of the same concentration. The locomotion of goldfish exposed to laboratory water and a steep gradient of 'copper-polluted' water in a free choice situation was monitored to establish the orientation of the fish in relation to the copper-containing mass of water. Separate tests were made for 0.005, 0.01, 0.025 and 10.0 ppm Cu(++) at 21 C plus or minus 1 degree in continuously flowing water. In all concentrations the number of entries into the copper affected zone and the time spent there per entry decreased significantly. Absolute avoidance of the copper-containing water mass did not occur even at 10.0 ppm. It is apparent that the locomotor response of the fish is dependent on the slope of the gradient of the copper ion, all other conditions being similar. A steep gradient may elicit avoidance escape; a shallow gradient may produce 'attraction'. (Jernigan-Vanderbilt)
W75-02104

ECOLOGY OF THE COPLAND RIVER WARM SPRINGS, SOUTH ISLAND, NEW ZEALAND,
Canterbury Univ., Christchurch (New Zealand). Dept. of Zoology.
M. J. Winterbourn.
N Z Ecol Soc Proc, 20, p 72-78, 1973.
Identifiers: Culex-pervigilans, *Ecology, Ephydrella-thermarum, Mastigocladus-laminosus, Oscillatoria-terebriformis, Rivers, Springs, Synechocytis-minuscula, Temperature, *Warm springs, *New Zealand(Copland River), Alkaline water, *Cyanophyta, Algae.

An ecological study of the alkaline Copland River warm springs in the South Island of New Zealand was made in Jan. 1972. Maximum water temperature was 57C and the upper limit of the dominant alga Mastigocladus laminosus was 50C. Other important species of blue-green algae present were Synechocystis minuscula and Oscillatoria terebriformis. Invertebrates (15 spp.) were found between 26 and 38C including the thermophile Ephydrella thermarum, which is often abundant in North Island warm springs and the common mosquito Culex pervigilans which previously was not recorded breeding in thermal waters. Observations made on warm springs at 4 other South Island localities are also recorded.--Copyright 1974, Biological Abstracts, Inc.
W75-02106

INFLUENCE OF TRISODIUM NITRILOTRIACETATE ON THE MORTALITY, GROWTH, AND FECUNDITY OF THE FRESHWATER SNAIL (HELISOMA TRIVOLVIS) THROUGH FOUR GENERATIONS,
Department of the Environment, Winnipeg (Manitoba). Fisheries and Marine Services.
J. F. Flannagan.
J Fish Res Board Can, Vol 31, No 2, p 155-161, 1974, Illus.
Identifiers: Acetates, Aquatic animals, Environmental studies, *Fecundity, *Growth rates, Helisoma-trivolvis, Invertebrates, *Mortality, Pollutants, *Snails, *Sodium compounds, Water pollution effects, *Nitrilotriacetate.

Studies on 4 succeeding generations of the snail H. trivolvis indicated that nominal concentrations of trisodium nitrilotriacetate (Na3NTA) up to 100 mg/l were not acutely toxic. Concentrations above 25 mg/l imposed a stress on the growth and fecundity of the snails. However, the effects were lessened with each succeeding generation. At predicted environmental levels Na3NTA is unlikely to have any lasting effect on euryplastic species of aquatic invertebrates, such as H. trivolvis.--Copyright 1974, Biological Abstracts, Inc.
W75-02107

TRANSPORT OF LEAD 203 AND CALCIUM 47 FROM MOTHER TO OFFSPRING,
Yugoslav Academy of Sciences and Arts, Zagreb. Inst. for Medical Research and Occupational Health.
K. Kostial, and B. Momcilovic.
Archives of Environmental Health, Vol 29, No 1, p 28-30, July, 1974. 1 tab, 24 ref.

Descriptors: *Lead, *Calcium, *Animal physiology, Human physiology, Toxicity, Laboratory animals, Rodents, Radioisotopes, Transfer.

The transfer of lead 203 and calcium 47 from mother to fetuses and litter was examined 48 hours after the single intravenous application of both radioisotopes to rats on the 18th day of pregnancy and on the fourth and 15th day of lactation. The transplacental transport of lead was eight times lower than that of calcium while the transmammary transport of lead was four times lower. The highest transfer of both radioisotopes from mother to litter was observed during the late lactation period. (Jernigan-Vanderbilt)
W75-02108

INFLUENCE OF DIETARY PYRIDOXINE ON CADMIUM TOXICITY IN RATS,
Auburn Univ., Ala. Dept. of Pathology and Parasitology.
H. D. Stowe, R. A. Goyer, P. Medley, and M. Cates.
Archives of Environmental Health, Vol 28, No 4, p 209-216, April, 1974. 5 fig, 6 tab, 49 ref. PHS(ES-00481).

Descriptors: *Vitamin B, *Cadmium, *Toxicity, *Rodents, Laboratory animals, Animal pathology,

Animal physiology, Iron, Testing procedures, Calcium, Lead, Copper, Diets.

The influence of 0, 22, and 44 ppm dietary pyridoxine (B6) upon the toxicity of 100 ppm dietary cadmium (Cd) was studied in rats. The most significant observation was an inverse correlation between the hematocrit readings of the Cd-toxic rats and their level of dietary B6. This interaction occurred prior to any significant differences among the cumulative Cd intakes. The Cd-toxic rats also exhibited polychromatophilia, incisor depigmentation, hypoferremia, cardiomegaly, splenomegaly, iron depletion of liver and kidney, and Cd accumulation in these organs. The severity of these changes was also related to the dietary level of B6. Although the data offer supportive evidence that Cd toxicity impairs iron metabolism, the sparing effect of B6 deficiency on Cd-induced anemia may be related to an influence of B6 on Cd transport rather than to an effect of B6 on iron homeostasis. (Jernigan-Vanderbilt)
W75-02109

VARIATION OF BIOLOGICAL HALF-LIFE OF METHYLMERCURY IN MAN,
Mosul Univ. (Iraq). Dept. of Physics.
H. Al-Shahristani, and K. M. Shihab.
Archives of Environmental Health, Vol 28, No 6, p 342-344, June, 1974. 2 fig, 1 tab, 5 ref.

Descriptors: *Mercury, *Human physiology, Public health, Laboratory tests, Organic compounds, Grains, Neutron activation analysis, Distribution.
Identifiers: *Methylmercury.

The variation of biological half-life (BHL) of methylmercury in 48 patients who had ingested treated grains was studied. The BHL was calculated from the distribution of mercury concentration along the head hair. Instrumental neutron activation analysis was used for mercury determination. The BHL of methylmercury varied from 35 to 189 days with an average of 72 days. The widespread BHLs indicated that some persons may face a much higher risk than others with the same body burden. This abnormality was not related to age or diet. (Jernigan-Vanderbilt)
W75-02110

PHARMACODYNAMICS OF METHYL MERCURY IN THE RAINBOW TROUT (SALMO GAIRDNERI): TISSUE UPTAKE, DISTRIBUTION AND EXCRETION,
State Univ. of New York, Buffalo. Dept. of Biochemistry.
F. J. Giblin, and E. J. Massaro.
Toxicology and Applied Pharmacology, Vol 24, p 81-91, 1973. 3 tab, 2 fig, 31 ref. FWPCA(18050 DRJ), EPA(14-16-0008-573, 14-16-0008-623).

Descriptors: *Mercury, *Rainbow trout, *Absorption, *Animal physiology, *Distribution, Salmo gairdneri, Fish, Toxins, Laboratory tests, Spectroscopy.
Identifiers: *Methylmercury.

The tissue distribution, rate of uptake and concentration of Hg-203-labeled methylmercury was investigated in 20 different tissues/organs over a period of 100 days following a single intragastric dose of 0.5 mg Hg/kg body weight. After 1 hr, mercury concentration factors less than 0.1 were detected in the blood, heart, liver, spleen, and kidney (a concentration factor (CF) of 1.0 equals mercury concentration in dose). Highest mercury concentrations (CF less than 7.0) were observed in the blood (at 7 days) and spleen (at 14 days). Maximum CF values were reached in the skeletal muscle, brain and lens after 34, 56, and less than 90 days, respectively. Maximum values were reached in most other tissues/organs at approximately 7 days. Skeletal muscle appeared to function as a reservoir for methylmercury and accumulated 50% of the dose from 34 to 100 days post administration. Methyl mercury accumulation in the brain was limited to 0.1% of the dose. The rate of mercury excretion appeared to be biphasic as a result of a slow elimination from the skeletal muscle relative to the other tissues/organs. Employing both the slow and fast rate, the half-retention time for methyl mercury in rainbow trout was estimated to be less than 200 days. (Jernigan-Vanderbilt)
W75-02112

PRELIMINARY STUDY ON THE DISTRIBUTION AND EFFECTS OF TWO CHEMICAL FORMS OF METHYL MERCURY IN PIKE AND RAINBOW TROUT,
Helsinki Univ. (Finland). Dept. of Radiochemistry.
V. Miettinen, E. Blankenstein, K. Rissanen, M. Tillander, and J. K. Miettinen.
Presented at: FAO Technical Conference on Marine Pollution and Its Effects on Living Resources and Fishing, Rome, Italy, 9-18, December 1970. 12 p, 8 tab, 23 ref. AEA (702/RB).

Descriptors: *Mercury, *Organic compounds, *Pikes, *Rainbow trout, *Toxicity, Chemistry, Fish, Laboratory tests, Testing procedures, Distribution, Pollutant identification.
Identifiers: *Methylmercury.

In Scandinavia and the U.S.A. the highest mercury concentrations of all fish species are reported in pike. Therefore, preliminary toxicity determinations of methylmercury on pike and on a salmonoid (rainbow trout) were carried out. Salmonoids usually are most sensitive to heavy metal poisoning. The specific purposes of the experiments were to determine whether methylmercury is more toxic in the free ionic form than when bound to SH-groups of proteins, as it is in the food chain in nature; to determine the approximate dose of methylmercury that is lethal to pike and rainbow trout; and to find the pathological changes and the gross distribution of labelled methylmercury in the fish. No detectable difference was found between the toxicity of the ionic and protein-bound forms of methylmercury to pike and rainbow trout. With fast dosing, the LD 50/30d value is approximately 15 mg Hg/kg for both species. This is evidently less than the fish could tolerate for months or years of chronic intake. The fish were able to defend themselves against the intake of the poison; of the ionic form about 50%, and of the protein-bound form, 75% was vomited immediately after administration. For what remained absorbed after the first day, an approximate biological half-time of 110 plus or minus 20 days was obtained. (Jernigan-Vanderbilt)
W75-02115

EFFECT OF CHELATING AGENTS ON CHROMIUM ABSORPTION IN RATS,
Washington State Univ., Pullman. Dept. of Animal Sciences.
N. S. C. Chen, A. Tsai, and I. A. Dyer.
Journal of Nutrition, Vol 103, No 8, p 1182-1186, August 1973. 4 tab, 20 ref.

Descriptors: *Chromium, *Chelation, *Absorption, *Rodents, Laboratory tests, Animal physiology, Testing procedures.

The effect of chelating agents on chromium absorption by rats was measured in vitro and in vivo. Four chelating agents: oxalate, phytate, citrate, and EDTA were used to determine their effect on chromium transport through the rat intestine in vitro. Oxalate significantly increased and phytate significantly decreased chromium transport through the rat intestine, while the other two chelating agents showed no significant effect. In an in vivo study oxalate and phytate had the same effects on trivalent chromium absorption in rats as that observed in vitro. The midsection of the rat intestine appears to be the most diffusible segment for chromium, followed by the ileum and duodenum. Under in vitro conditions, Cr 51 was also more highly absorbed in the midsection than in either of the other two segments. Fasted rats absorbed chromium at a significantly faster rate than nonfasted ones. (Jernigan-Vanderbilt)
W75-02190

BIOLOGICAL RESPONSE AND SUBJECTIVE SYMPTOMS IN LOW LEVEL LEAD EXPOSURE,
Keio Univ., Tokyo (Japan). Dept. of Preventive Medicine and Public Health.
H. Sakurai, M. Sugita, and K. Tsuchiya.
Archives of Environmental Health, Vol 29, No 3, p 157-163, September 1974. 4 fig, 2 tab, 68 ref.

Descriptors: *Lead, *Toxicity, Biology, *Public Health, Human pathology, Enzymes, Organic compounds, *Air pollution effects.

Workers occupationally exposed to lead in the air of up to 60 micrograms/cu m were examined for blood lead (Pb-B), urinary delta-aminolevulinic acid (ALA), erythrocyte ALA dehydrase (ALAD), hemoglobin, hematocrit, red blood cell count, and subjective symptoms. The Pb-B and ALAD showed consistent increases and decreases, respectively, corresponding with the levels of Pb exposure, while other tests revealed no association with Pb. The range of Pb exposure as expressed by Pb-B was up to 50 micrograms/100 gm. Subjective symptoms and urinary ALA are not likely to be increased at the Pb-B level of about 50 micrograms/100 gm and less. (Jernigan-Vanderbilt)
W75-02191

RENAL AND SKELETAL LESIONS IN EXPERIMENTAL CADMIUM POISONING,
Kyoto Univ. (Japan). Dept. of Hygiene.
Y. Itokawa, T. Abe, R. Tabei, and S. Tanalta.
Archives of Environmental Health, Vol 28, No 3, p 149-154, March, 1974. 9 tab, 4 fig, 29 ref.

Descriptors: *Cadmium, *Toxicity, *Trace elements, *Rodents, Animal physiology, Animal pathology, Public health, Laboratory animals, Laboratory tests, Testing procedures, Calcium, Analytical techniques, Spectroscopy, *Pollutant identification.

Male Wistar rats were separated into four groups and given four different dietary regimens. After 120 days, the rats were killed and examined histologically and biochemically. Remarkable abnormalities were observed in kidneys and femurs in cadmium treated rats. Renal hypertrophy and degenerative changes in tubules and glomeruli were evident. In femurs, thinning of cortical osseous tissue, decrease in osteocytes, decrease in acid mucopolysaccharides in epiphyseal cartilage, and appearance of osteoid plus fat deposition in bone marrow were significant in calcium-deficient cadmium-treated rats. (Jernigan-Vanderbilt)
W75-02192

ARSENIC IN BLOOD AND URINE OF FOREST WORKERS,
Oregon State Univ., Corvallis. Environmental Health Sciences Center.
For primary bibliographic entry see Field 5A.
W75-02193

OUTBREAK OF FOOD POISONING DUE TO ALKYL-MERCURY FUNGICIDE,
Ghana Univ. Medical School, Accra. Dept. of Preventive and Social Medicine.
L. K. A. Derban.
Archives of Environmental Health, Vol 28, No 1, p 49-52, January, 1974. 1 tab, 13 ref.

Descriptors: *Mercury, *Toxicity, *Public health, Food, *Human pathology, Grains, Organic compounds, Pesticides, Legislation, Regulation, Human physiology, *Corn(Field).
Identifiers: *Ghana.

144 cases of alkyl-mercury poisoning in rural Ghana were investigated. Out of ignorance, the patients had ingested maize which was dressed with ethylmercuric chloride and intended for sowing. They all showed the usual clinical features of alkyl-mercury poisoning, and 20 persons died. The incidence demonstrated the serious health hazards involved in the agricultural use of alkyl-mercury compounds as fungicides in an unsophisticated rural community. To achieve proper control, it is important to have legislation compelling the registration of all pesticides used in the country, prohibiting the importation of pesticides, without prior approval and a special license, requiring proper labeling which should include the name of the active ingredient and the recommended ways of using it safely, and controlling the sale and distribution of at least the more dangerous pesticides to accredited users who must comply with certain regulations regarding protective clothing and equipment, washing facilities, and proper recording of all operations. (Jernigan-Vanderbilt)
W75-02194

THE METABOLISM OF BENZO (A) PYRENE IN RAT LIVER MICROSOMES: THE EFFECT OF ASBESTOS-ASSOCIATED METAL IONS AND PH,
National Research Inst. for Occupational Diseases, Tiervlei (South Africa).
R. Thompson, I. Webster, and T. A. Kilroe-Smith.
Environmental Research, Vol 7, No 2, p 149-157, April, 1974. 5 fig, 1 tab, 25 ref.

Descriptors: *Asbestos, *Trace elements, *Metals, *Rodents, *Metabolism, Copper, Zinc, Nickel, Chromium, Laboratory animals, Laboratory tests, Public health, Inorganic compounds, Enzymes, Lead, Iron, Hydrogen ion concentration.

Experimental evidence is presented to support the hypothesis that trace metals and other factors associated with asbestos mined in different areas play a more critical role in the development of 'asbestos tumors' than the actual fiber itself. IN VITRO experiments were performed to investigate the effect of these associated factors on the metabolism of benzo (a) pyrene, a carcinogen introduced into the lung as a result of smoking and atmospheric pollution. The amount of benzo (a) pyrene metabolized by the enzyme in rat liver microsomes was measured in the presence of increasing amounts of trace metal ions. Copper, zinc, lead, nickel, chromium, ferrous, ferric, and magnesium ions were found to inhibit enzyme activity to an increasing extent as their concentration increased; manganese was an exception in that it activated the enzyme at lower concentrations and inhibited it at higher concentrations. Enzyme activity was also considerably affected by changes in pH, with a great loss of activity at the high pH values measured for aqueous suspensions of crocidolite and chrysotile. The effect of manganese ions differed at various pH values, the enzyme-activation effect of these ions being restricted to a much smaller concentration range at a high pH. (Jernigan-Vanderbilt)
W75-02195

5D. Waste Treatment Processes

PRETREATMENT OF SALINE WATER PRIOR TO DESALINATION,
Department of the Interior, Washington, D.C.
R. H. Horowitz.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-219 864, $3.25 in paper copy, $2.25 in microfiche. Patent Application No 342,919, March 19, 1973. 4 p, 3 fig.

Descriptors: *Saline water, *Desalination, *Fouling, Sea water, Instrumentation, Desalination apparatus, Potable water, Aeration, Centrifugation, *Waste water treatment.

A new and useful improvement in pretreatment of saline water prior to desalination was described. The objective was to remove equipment fouling substances from saline water prior to desalination. Saline water is pumped through a venturi to draw in air which intimately mixes with the water. The mixture is centrifuged to form a saline water phase and a froth phase. Desalination is then employed to produce fresh water from the saline water phase. (Jernigan-Vanderbilt)
W75-01656

REMOVAL OF MERCURY FROM SOLUTION,
Department of the Interior, Washington, D.C.
W. N. Marchant.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-225 017, $3.25 in paper copy, $2.25 in microfiche. Patent Application, No 398,908, September 19, 1973. 9 p, 3 tab.

Descriptors: *Mercury, *Aqueous solutions, *Pollution abatement, *Adsorption, Pollutants, Cellulose, Separation techniques, *Waste water treatment.

A new improvement in the removal of mercury from solutions was described. Various examples show the preparation and application of the method. Mercury may be efficiently and economically removed from solution, without introduction of other pollutants, by treating the solution with a modified cellulose adsorbent having vicinal thiol groups grafted onto the cellulose matrix. The adsorbent is highly selective for mercury, independent of pH over a range of about 1 to 9, and effective in acidic brine. (Jernigan-Vanderbilt)
W75-01657

NEW ELECTROCHEMICAL TECHNIQUE FOR THE SEPARATION OF LEAD AT TRACE LEVELS FROM NATURAL SILICATES,
Oxford Univ., (England). Dept. of Geology and Mineralogy.
For primary bibliographic entry see Field 5A.
W75-01669

QUANTITATIVE RECOVERY OF TRACE AMOUNTS OF CYANIDE IN SURFACE WATERS USING A MODIFIED SERFASS DISTILLATION PROCEDURE,
Industrial BIO-Test Lab., Northbrook, Ill. Environmental Sciences Div.
For primary bibliographic entry see Field 5B.
W75-01672

AGP TEST ON COMMUNITY SEWAGE: III. STOCKHOLM'S CHEMICAL TREATMENT PLANTS, 1972, (IN SWEDISH),
Uppsala Univ. (Sweden). Inst. of Physiological Botany.
C. Forsberg, and E. Hokervall.
Vatten. Vol 29, No 3, p 281-289, 1973, Illus. English summary.
Identifiers: *Algal growth potential tests, Biological studies, *Chemical treatment, Flocculation, Sewage, *Sweden(Stockholm), Tests, *Waste water treatment, Treatment facilities.

During 1972, the efficiency of sewage treatment at the chemical and biological treatment plants at Akeshov-Nockeby, Eolshall and Loudden, Stockholm, Sweden, was tested using an algal assay procedure. At Akeshov-Nockeby, Eolshall (Jan.-March) and Loudden, Al-sulfate was used for chemical flocculation. From May to the end of the year, Fe-chloride was tested at Eolshall. The daily rhythm of algal production by sewage effluent from Akeshov-Nockeby and Eolshall, July-Dec., is presented. The effluent from these plants gave lower average values of AGP (algal growth potential) for 1972 than for the year before. The average values for AGP, PO4-P, total-P, total-N, suspended solids and BOD5 (biological oxygen demand) are given. Correlation coefficients for monthly average values are presented. Good correlation was observed between the content of total P and suspended solids. During the investigation period the treatment processes were disturbed several times by incoming oil, toxic compounds and technical errors.--Copyright 1974, Biological Abstracts, Inc.
W75-01677

TRACE ELEMENT EMISSIONS FROM THE COMBUSTION OF FOSSIL FUELS,
Commonwealth Edison Co., Chicago, Ill.
For primary bibliographic entry see Field 5B.
W75-01692

AREAWIDE WASTE TREATMENT PLANNING AREAS AND RESPONSIBLE AGENCIES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01722

MARINE SANITATION DEVICES--PROPOSED RULES.
Coast Guard, Washington, D.C.
Federal Register, Vol 38, No 116, p 15918-15921, June 18, 1973.

Descriptors: *Regulation, *Coast Guard regulations, *Administrative agencies, *Federal Water Pollution Control Act, *Water pollution sources, *Ships, Administration, Federal government, Adoption of practices, Standards, Design standards, Specifications, Water pollution control, Environmental sanitation, Waste water disposal, Waste water treatment, Sewage treatment, Sewage disposal, Primary treatment, Secondary treatment, Navigable waters, Legislation.
Identifiers: *Administrative regulations, Coastal waters.

This is an advance notice of proposed rulemaking, published in order to elicit views and data and to assist in drafting rules for the design, construction, and operation of marine sanitation devices. Under the Federal Water Pollution Control Act the Environmental Protection Agency has promulgated federal standards of performance for marine sanitation devices. The Act requires such devices be designed so as to prevent the discharge of untreated or inadequately treated sewage into or upon navigable waters from new or existing vessels. In 1971 the EPA proposed standards that would have required a level of sewage treatment equivalent to secondary treatment standards. Comments received showed that flow through devices to meet those standards were not presently available for smaller vessels. The 1971 standards provided that primary treatment and disinfection constituted adequate compliance until the effective date of a regulation requiring no discharge. The Coast Guard shall promulgate and enforce regulations, and also collect data on the manufacture and use of sanitation devices. (Sperling-Florida)
W75-01727

PLANT EXPANDED FOR ADVANCED WASTE TREATMENT.
Public Works, Vol 105, No 7, p 86, July, 1974.

Descriptors: *Sewage treatment, *Treatment facilities, Equipment, Automatic control, *Tertiary treatment, Monitoring, Optimization, Texas, *Waste water treatment.
Identifiers: Garland(Tex).

Expansion of the sewage treatment facility at Garland, Texas, will feature a new and innovative treatment unit in parallel with an existing trickling filter plant in order to meet the demand for high quality waste effluent. The proposed additional chemical-physical treatment processes are

equalization and aeration, pre-treatment, chemical clarification, recarbonation, filtration, carbon adsorption, disinfection, sludge dewatering, and scum disposal. The process control system is designed for automated plant operation with all unit systems within the complex either directly controlled or monitored for optimization purposes. (Sandoski-FIRL)
W75-01736

USE HIGHWAY FUNDS TO TREAT STREET RUNOFF,
Metropolitan Sanitary District of Greater Chicago, Ill.
V. Janicki.
Water and Sewage Works, Vol 121, No 6, p 82, June, 1974.

Descriptors: *Taxes, *Sewerage, Federal government, Highway effects, Storm runoff, Urban runoff, Waste water treatment, Treatment facilities, Sewers, *Illinois, *Pollution charges(Taxes).
Identifiers: Chicago(Ill).

An amendment to the Motor Fuel Revenue Act should be initiated so as to redistribute federal tax monies to include municipal sewerage agencies whose waste treatment plants and sewer systems collect and treat highway runoff. The greater Chicago area, Cook County, is shown as an example of the misuse and overuse of a sewerage system. (Sandoski-FIRL)
W75-01737

EXPANSION SPARKS NEW DESIGN,
Malcolm Pirnie, Inc., White Plains, N.Y.
For primary bibliographic entry see Field 5F.
W75-01743

STATIC CALCULATION OF SEWAGE PIPES MADE FROM HIGH-PRESSURE POLYETHYLENE (STATISCHE BERECHNUNG VON ABWASSERROHREN AUS POLYAETHYLAN),
For primary bibliographic entry see Field 8B.
W75-01745

THE SEWAGE PURIFICATION PLANT AROSA (DIE ABWASSERRENINI-GUNGSANLAGE AROSA).
Schweizerische Bauzeitung, Vol 92, No 22, p 534-536, 1974. 2 fig.

Descriptors: *Municipal wastes, *Waste water treatment, Pre-treatment, Sludge, *Aeration, *Biological treatment, Polyelectrolytes, Treatment facilities.
Identifiers: *Sewage purification plants, *Filter press, *Switzerland(Arosa).

The municipal waste water treatment plant of the ski resort Arosa in Switzerland, established at 1,618 m over sea level, is described. The basins for mechanical separation and biological treatment are built as one unit, and are then roofed over. The treatment is conducted in two pre-treatment stages, two aeration basins, and two biological after-treatment basins. The sludge is stabilized by anaerobic digestion at 33 C in two stages with dwell times of 18 and 26 days, respectively. The sludge is then conditioned by means of polyelectrolyte and pressed in filter presses. (Takacs-FIRL)
W75-01750

STUDIES ON THE PURIFICATION OF PETROLEUM REFINERY-GENERATED EFFLUENTS BY PRESSURE FLOTATION WITH REAGENTS (ISSLEDOVANIYA V OBLASTI STOCHNYKH VOD NPZ METODOM REAGENTNOY NAPORNOY FLOTATSII),
V. P. Sokolov, and Z. I. Pusteseleva.
Neftepererabotka i Neftekhimiya, No 2, p 11-13, 1974. 1 fig, 1 tab, 3 ref.

Descriptors: *Purification, *Laboratory tests, *Flocculation, Flotation, Effluents, Petroleum, Industrial wastes, *Waste water treatment.
Identifiers: *Pressure flotation.

Possibilities of increasing the efficiency of the purification of petroleum refinery-generated effluents by pressure flotation by means of reagents, combining flocculation and flotation, were studied in laboratory and full-scale tests. The efficiency of the removal of mechanical impurities and petroleum products from such waste waters was found to be determined primarily by the formation of metal hydroxide floccules which in turn adsorb the petroleum products. Low-intensity aeration, low flow rate from the flocculator to the flotator, and recirculation of part of the purified effluent at a rate of about 50 percent are required for efficient purification. (Takacs-FIRL)
W75-01751

FERRIC CHLORIDE INCREASES WATER PLANT EFFICIENCY,
Philadelphia Water Dept., Pa. Torresdale Plant.
For primary bibliographic entry see Field 5F.
W75-01752

NITRIFICATION IN THE BIOLOGICAL FIXED-FILM ROTATING DISK SYSTEM,
Buck, Seifert and Jost, Inc., Englewood Cliffs, N.J.
C.-N. Weng, and A. H. Molof.
Journal Water Pollution Control Federation, Vol 46, No 7, p1674-1685, July, 1974. 10 fig, 2 tab, 13 ref.

Descriptors: *Biological treatment, *Waste water treatment, *Nitrification, Equipment, Investigations, Efficiencies, Design criteria, Operations, *Treatment facilities.
Identifiers: Rotating disks.

The biological fixed-film rotating disk (BFFRD) system consists of a series of reactors each of which contains a number of closely spaced rotating vertical disks partially submerged in the waste water. It is used as a supporting media for biological growth, as a mechanism for aeration, and as a means of contacting the microorganisms with the waste water. Although many advantages of this process enhance the possibility of its selection over the trickling filter and the activated sludge process, additional basic studies are required to provide data for the optimum design and operation of waste water plants that oxidize ammonia to nitrate. This investigative work concentrates on the use of a single rotating disk in each reactor in a six-stage system. Among conclusions established, it is shown that the BFFRD system is an efficient treatment unit for nitrification. (Sandoski-FIRL)
W75-01753

OZONATION OF LACTIC ACID FERMENTATION EFFLUENT,
New York State Agriculture Experiment Station, Geneva. Dept. of Food Science.
R. H. Walter, and R. M. Sherman.
Journal Water Pollution Control Federation, Vol 46, No 7, p 1800-1803, July, 1974. 2 fig, 1 tab, 10 ref.

Descriptors: *Ozone, *Waste water treatment, Food processing industry, Chemical reactions, *Fermentation.
Identifiers: *Lactic acid, Sauerkraut brine.

Lactic acid fermentation of cabbage to produce sauerkraut generates a strongly buffered, acidic brine that is not conductive to stabilization by conventional biological methods. Because of its high oxidation potential, rapid reactivity, and almost complete removal of carbon by carbon dioxide evolution, ozone is investigated as a possible treatment method for sauerkraut brine. Preliminary calculations showed that the ratio of ozone consumed to chemical oxygen demand reduced in a 72-hour period was approximately 2.0 It is concluded that where ozone generators already have been installed in the food processing industry and where small batches of refractory effluents are not ammenable to biological stabilization, ozonation may be applied as a chemical alternative. (Sandoski-FIRL)
W75-01754

THE SOLUBILITY PRODUCT OF FERROUS PHOSPHATE,
Rutgers-The State Univ., New Brunswick, N.J. Dept. of Environmental Sciences.
For primary bibliographic entry see Field 5B.
W75-01755

REVERSE OSMOSIS TREATMENT WITH PREDICTABLE WATER QUALITY,
Permutit Co., Paramus, N.J.
L. B. Luttinger, and G. Hoche.
Environmental Science and Technology, Vol 8, No 7, p 614-618, July, 1974. 1 tab.

Descriptors: *Reverse osmosis, *Reviews, Water quality, *Waste water treatment, Contaminants.

A review of the reverse osmosis process is detailed. Areas of consideration include: treating water contaminants, such as particulate matter, calcium sulfate, iron and manganese, and colloids; handling contaminants such as dissolved organics, bacteria and their metabolic products, and silica and silicates. Methods for judging the effectiveness of a chemical pre-treatment step are mentioned. (Sandoski-FIRL)
W75-01756

REGIONAL PLANT SOLVES SMALL-TOWN WASTEWATER PROBLEM,
Gloversville-Johnstown Sewer Board, N.Y.
H. C. Cuttica, and R. A. Armstrong.
The American City, Vol 89, No 7, p 31-33, July, 1974. 3 fig.

Descriptors: *Waste water treatment, *Treatment facilities, *Interceptor sewers, *Biological treatment, Trickling filters, Activated sludge, Sludge treatment, Dewatering, Landfills, Equipment, Control systems, Taxes, *New York, Regional development.
Identifiers: Combined treatment, Cayadutta River(NY).

In 1967, the towns of Gloversville and Johnstown built an interceptor sewer and treatment plant to purify both the domestic and industrial wastes, having a population equivalent to about 200,000. The plant, designed for treatment of 13 mgd, uses two-stage biological treatment which includes a high-rate trickling filter and activated sludge. Wet-air oxidation of sludge is followed by dewatering on vacuum filters with final disposal at a landfill. Hazard warning devices include a Mine Safety Appliance combustible gas detection cell and two Slovay chlorine leak detectors. Sewer service charges have been levied to retire the debt and to operate and maintain the facilities. The charge amounts to 75 percent of the water bill for residential consumers; commercial and industrial users pay surcharge on the water bills, depending upon the strength of their waste. (Sandoski-FIRL)
W75-01757

WASTEWATER TREATMENT FOR SMALL COMMUNITIES: PART ONE,
California Univ., Davis. Dept. of Civil Engineering.
G. Tchobanoglous.
Public Works, Vol 105, No 7, p 61-68, July, 1974. 2 fig, 9 tab, 12 ref.

Descriptors: *Waste water treatment, *Biological treatment, *Treatment facilities, Operation and

maintenance, Trickling filters, Activated sludge, Oxidation lagoons, Irrigation, Overland flow, Infiltration, Operations, Performance, *Design criteria, Equipment, Alternative costs, *Alternative planning.
Identifiers: Imhoff tank, Biological rotating disks.

Seventy-five million people in the United States are served by small treatment systems of various design, and the problems associated with these plants are becoming apparent. Some of these general problems are defined, and alternative treatment processes usable by small communities with some design considerations of major importance for small plants are reviewed. The alternative treatment processes are compared from an economic standpoint. (Sandoski-FIRL)
W75-01758

EXPERIMENTAL STUDIES ON A KINETIC MODEL FOR DESIGN AND OPERATION OF ACTIVATED SLUDGE PROCESSES,
Oklahoma State Univ., Stillwater. Bioengineering Lab.
A. F. Gaudy, Jr., and R. Srinivasaraghaven.
Biotechnology and Bioengineering, Vol 16, No 6, p 723-738, June, 1974. 6 fig, 5 tab, 16 ref.

Descriptors: Treatment facilities, Laboratory tests, *Growth rates, *Activated sludge, Model studies, *Pilot plants, Aerobic conditions, Cultures, Cultural control, Efficiencies, *Waste water treatment, *Kinetics, *Design, *Operations.
Identifiers: Recycle cell concentration.

Previous laboratory experimentation has shown that the classical theory developed for continuous growth of pure cultures in completely mixed aerobic systems in which the recycle cell concentration factor is a selectable system constant, did not provide a suitable model for the heterogeneous populations of the activated sludge process. Another model was derived in which the recycle cell concentration was employed as a system constant and computational analysis was performed. Laboratory pilot plant experimentation was undertaken in order to determine whether a steady state in aerator biological solids concentration and substrate concentration could be approached under this mode of operation. It was found that the model approached the steady state condition with heterogeneous populations more closely than did the classical model, and the high degree of treatment efficiency predicted by the model was demonstrated experimentally. (Sandoski-FIRL)
W75-01759

MODEL PROCESS FOR BIOLOGICAL PHOSPHATE ELIMINATION FROM COMMUNAL WASTE WATER II. BIOLOGICAL PHOSPHATE ELIMINATION FOLLOWING DENITRIFICATION OF THE WASTE WATER NITROGEN BY MEANS OF METHANOL, (MODELLVERFAHREN ZUR BIOLOGISCHEN ENTPHOSPHATUNG KOMMUNALER ABWAESSER. II. BIOLOGISCHE ENTPHOSPHATUNG IM ANSCHLUSS AN DIE DENITRIFIKATION DES ABWASSERSTICKSTOFFS MITTELS METHANOL),
G. Bringmann, and R. Kuehn.
Gesundheits-Ingenieur, Vol 95, No 5, p 135-138, 1974. 1 fig, 8 tab.

Descriptors: *Phosphate, *Biological treatment, *Municipal wastes, *Waste water treatment, *Denitrification, Model studies, Aeration, Treatment facilities.

Biological phosphate elimination from municipal waste water in connection with and following denitrification by means of methanol in a model biological waste water treatment plant is described. The first stage of the treatment plant constitutes an aerated nitrifying tank for the quantitative nitrification of the ammonium nitrogen in the waste water. The methanol denitrification in the second stage has an efficiency of 94.8 percent with respect to an initial nitrate content of 65.3 mg/liter. One mg nitrate-nitrogen required 3.3 mg methanol for its denitrification. The effluent from the third stage (trickling body) showed a secondary increase in the residual nitrate-nitrogen content. However, the nitrate-nitrogen consumption in the fourth stage (phosphate elimination) resulted in a residual nitrate-nitrogen level of 2.35 mg/liter, corresponding to a total nitrate-nitrogen elimination rate of 96.4 percent. The phosphate elimination in the nitrification was dependent on the waste water quality: while there was practically no phosphate elimination at neutral pH, phosphate elimination at alkaline pH reached efficiencies of up to 74.1 percent. Depending on the phosphate content in the nitrification effluent, the efficiency of phosphate elimination in the denitrification stage ranged from 80.35 to 41.3 percent. Relative to the trickling body effluent, the phosphate elimination was 92.7-89.5 percent. Following filtration of the effluents from the phosphate elimination stage by means of ferrooxidizing bacteria at neutral pH, a residual phosphate content of 0.006-0.007 mg/liter, corresponding to an overall efficiency of 99.96 percent, was achieved. (Takacs-FIRL)
W75-01765

STUDY OF THE EFFICIENCY OF THE REMOVAL OF BENZO-(A)PYRENE FROM URBAN WASTE WATER BY BIOLOGICAL PURIFICATION, (IZUCHENIYE EFFEKTIVNOSTI BIOLOGICHESKOY OCHISTKI GORODSKIKH STOCHNYKH VOD OT BENZ(A)PIRENA),
K. P. Yershova, Y. I. Nefedov, L. S. Kanunnikova, and M. G. Krylova.
Gigiyena i Sanitariya, No 2, p 102-103, 1974. 1 tab.

Descriptors: *Municipal wastes, *Biological treatment, Laboratory tests, *Waste water treatment, Absorption, Activated sludge, *Water purification, *Oil wastes.
Identifiers: Benzo(a)pyrene, Ether-soluble petroleum.

The efficiency of the removal of benzo(a)pyrene and ether-soluble petroleum products from municipal waste water by biological purification was studied in full-scale and laboratory experiments. The mechanical purification step comprising the sand trap hd an efficiency of about 40 percent in the removal of benzo(a)pyrene. Total biological treatment in the activated sludge aeration basin and an after-treatment basin resulted in a rate of benzo(a)pyrene removal of 77.5-98.6 percent averaging 91.2 percent. The efficiency of the biological treatment in the removal of ether-soluble hydrocarbons ranged from 62.9 to 88.4 percent. Some correlations between the rates of removal of benzo(a)pyrene and ether-soluble hydrocarbons were observed. The efficiency of the biological treatment was found to gradually decrease in the course of aeration. The reduction of the benzo(a)pyrene content in the waste water during the biological treatment was partly due to absorption on the activated sludge particles and partly to metabolism. (Takacs-Franklin)
W75-01766

FATTY OIL-WATER SEPARATION PROCESS,
Gkb Enterprises, Inc., Placentia, Calif. (assignee)
H. F. Keller, Jr.
United States Patent 3,803,031. Issued April 9, 1974. Official Gazette of the U.S. Patent Office, Vol 921, No 2, p 702, April, 1974.

Descriptors: *Patents, *Separation techniques, *Filters, Acidity, Alkalinity, *Oil-water interfaces, *Oily water, *Waste water treatment, Lipids, Effluents, Hydrogen ion concentration.
Identifiers: Oil-water separation, Fatty constituents, Filter media, Clarification.

Aqueous systems containing fatty constituents and particulate solids and having a pH from about 1 to 4.8 are filtered through a finely divided, acid and alkali resistant filter media having a particle mesh size range from about 12 to 60 at a rate from about 1 to 50 gallons per minute per square foot of filter media surface area. Fatty constituents and particulate solids are retained by the filter media and the effluent is clarified water. The filter media is periodically regenerated by: agitating the media in the presence of a saponifying alkaline solution to extract fatty constituents; withdrawing the alkaline solution from the filter media; passing fresh water through the filter media in the same direction of flow as that of the aqueous system to remove residual water soluble materials; and backwashing the filter media with fresh water to remove insoluble and non-dispersible particulate solids. (Prague-FIRL)
W75-01768

AIR DIFFUSION UNIT,
Caldwell Connell Engineers, Melbourne (Australia).
R. C. Aberley, G. B. Rettray, and P. P. Dougas.
Journal Water Pollution Control Federation, Vol 46, No 5, p 895-910, May, 1974. 18 fig, 3 tab, 11 ref.

Descriptors: *Aeration, Diffusion, Circulation, *Activated sludge, *Waste water treatment, *Design criteria, *Design standards, Pilot plants, Efficiencies, On-site tests, Performance, *Australia, Dissolved oxygen.
Identifiers: *Air diffusion unit, Aeration system.

Design criteria, final design, and performance testing of a prototype air diffusion unit and aeration system for an activated sludge treatment facilities are described. Seven diffuser arrangements were studies, Results showed that the initial assumption of complete mixing was justified by the uniform dissolved oxygen levels at all sampling points for each run. Testing also showed that flat porous plates arranged in a closely spaced pattern over the entire floor of an aeration tank produce a bubble and circulation pattern resulting in very high oxygen transfer efficiencies (13-19 percent at a submergence of 15 ft). This oxygen transfer efficiency greatly increased at air flow rates of 40-50 cfm. It was also discovered that sodium metabisulphate is unsuitable for oxygen uptake tests. (Shaffer-FIRL)
W75-01771

AUTOMATIC CONTROL OF AN ACTIVATED SLUDGE REACTOR,
Connecticut Univ., Storrs. Dept. of Chemical Engineering.
H. E. Klei, and D. W. Sundstrom.
Journal Water Pollution Control Federation, Vol 46, No 5, p 993-998, May, 1974. 9 fig.

Descriptors: *Waste water treatment, *Biological treatment, *Activated sludge, *Automatic control, Monitoring, Treatment facilities, *Pilot plants, Connecticut.

Biological reactors, and activated sludge reactors in particular, can be difficult to control. Part of the problem is in the long residence times (1 to 8 hr). Other characteristics of these facilities that create difficulties include: nonlinear reaction kinetics; undefined mixing; autocatalytic nature of the processes, and mixed nature of both substrate and bacteria. To maintain consistent water quality with biological treatment procedures it is important to detect a change in the process as soon as possible by measuring input properties rather than waiting until the change becomes apparent in the output stream. A feed forward control system was constructed and demonstrated on a pilot activated sludge reactor using primary effluent from a municipal sewage treatment plant. This control system can be used to control both air and recycle solids rates to the reactor to compensate for increases in the carbon level of the feed stream. When the test system was operated at residence times comparable to those of a municipal plant,

the effluent concentration was held constant when the return rate of recycle solids was controlled as a function of the input of the carbon level. Lower conversion and residence times produced unsatisfactory results. (Shaffer-FIRL)
W75-01772

RESTRAINING TUBE FOR SEWER ROD,
C. B. Caperton.
United States Patent 3,805,462. Issued April 23, 1974. Official Gazette of the U.S. Patent Office, Vol 921, No 4, p 1354, April 23, 1974. 1 fig.

Descriptors: *Patents, *Sewers, Equipment, Manholes, Storage, Transportation, Waste water treatment.
Identifiers: *Sewer rods, *Sewer restraining tubes.

A rigid restraining tube is provided for use in manholes for restraining the sewer rod. This is used in clearing sewer obstructions, against the reaction forces which are set up when the forwardly driven sewer rod encounters the obstruction. The restraining tube is a series of short section connected together by rigid links. Each section is split in half axially, forming a series of section halves, adapted to be wound up on opposing reels for storage and transportation. The sections of tube need not abut against each other since they are connected rigidly by the links. (Prague-FIRL)
W75-01773

BIOLOGICAL WASTE TREATMENT PROCESS,
L. G. Smith, and J. W. Hood.
United States Patent 3,806,448. Issued April 23, 1974. Official Gazette of the U.S. Patent Office, Vol 921, No 4, p 1603, April 23, 1974. 1 fig.

Descriptors: *Patents, *Waste water treatment, *Biodegradation, *Aerobic treatment, *Sludge treatment, Microbiology, Separation techniques.
Identifiers: *Microbial biolysis, Clarification.

A method of treating waste material containing biodegradable matter and non-biodegradable matter is described. This involves an aerobic treatment step and a final clarifier in which a final sludge is separated. The final sludge is disintegrated and separated into a first fraction containing the biodegradable material and a second fraction containing inert material, which is discarded. The first fraction is returned to the aerobic treatment unit with or without microbial biolysis. (Prague-FIRL)
W75-01774

QUALITY CONTROL APPLIES TO RIVER POLLUTION,
Australian Road Research Board, Vermont.
M. A. Muspratt.
International Journal of Environmental Studies, Vol 5, No 2, p 137-142, 1973. 3 fig, 6 ref.

Descriptors: *Water pollution control, *Quality control, *Rivers, *Waste water treatment, *Statistical methods, Treatment facilities, Municipal wastes, Domestic water, Effluents, Biochemical oxygen demand, Sampling, Human population.
Identifiers: Operating characteristics, Control charts, Acceptance sampling.

Rigorous statistical quality control is a powerful new tool to add to man's growing repertoire of pollution control devices. A scheme is described for a realistic statistical quality control encompassing both control charts and operating characteristics for acceptance sampling of the BOD of effluents from a treatment plant for domestic waste water. This entails developing pilot sampling procedures; control charts are to be used by the manager or operator of the treatment plant for efficacious and simple control of treatment in progress, and operating characteristics for acceptance sampling of the amount of aquatic pollution downstream from the treatment plant. As an example, a three-stage municipal waste water treatment plant is assumed, and the unit processes considered are: (1) primary clarification; (2) secondary treatment by trickling filter and final clarifier, or activated sludge and final clarification; and (3) tertiary treatment by mixed media filtration and carbon absorption (and micro-straining if river flow is low or the river is already somewhat polluted). An almost fail-safe crosscheck on control is achieved by a division of responsibility between plant operator and municipal authorities. (Bell-Cornell)
W75-01812

BIOLOGICAL TREATMENT TECHNOLOGY (162),
Environmental Protection Agency, Cincinnati, Ohio. Municipal Permits and Operations Div.
F. J. Ludzack.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-228 148, $9.50 in paper copy, $2.25 in microfiche. December, 1973, 326 p.

Descriptors: *Publications, *Training, *Biological treatment, Methodology, Activated sludge, Analytical techniques, Cost-benefit theory, Environmental control, Disinfection, Laboratory tests, Industrial wastes, Measurements, Municipal wastes, Nutrients, Maintenance, Project planning, Recycling, Safety, Education, Separation techniques, Toxicity, *Waste water treatment, Trickling filters.
Identifiers: *Manuals, Treatment operations.

Instructional materials to assist the student to upgrade performance of biological treatment facilities are provided. Information gathering techniques related to waste water characteristics, concentrations, and loading are described. The influence of these data upon common treatment operations and correction of treatability difficulties are considered. Operational control to maximize the performance of existing facilities are discussed along with selection of add-on operations or design of new facilities to upgrade the treatment system to a performance compliance status. (Prague-FIRL)
W75-01838

MANPOWER REQUIREMENTS FOR WASTE WATER COLLECTION SYSTEMS IN CITIES AND TOWNS UP TO 150,000 IN POPULATION.
North Carolina Agricultural and Technical State Univ., Greensboro. Center for Manpower Research and Training.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-227 039, $3.25 in paper copy, $2.25 in microfiche. June, 1973. 111 p, 11 fig, 1 tab, 10 ref. EPA Grant T-900211.

Descriptors: *Water pollution control, *Municipal wastes, *Municipal water, Human populations, Personnel, Occupations, Human resources, Working conditions, Employment, Labor, Planning, Training, Publications, Manpower.
Identifiers: *Manpower requirements, Occupational description.

Manpower requirements for effective operation and maintenance of waste water collection systems in municipalities of under 150,000 people are developed. Occupational Descriptions include duties, physical demands, and working conditions, as well as behavioral and psychological traits recommended for various positions. Manpower planners and trainers as well as administrators have need of curriculum programs for training of personnel and development of resources. (Prague-FIRL)
W75-01840

RECREATIONAL REUSE OF MUNICIPAL WASTEWATER,
Texas Tech Univ., Lubbock. Water Resources Center.
M. Headstream, D. M. Wells, R. M. Sweazy, and E. D. Smith.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 856, $4.25 in paper copy, $2.25 in microfiche. Completion Report, No WRC-74-3, August 1974. 55 p, 13 fig, 11 tab, 27 ref. OWRR C-4270(No 9043)(1). 14-31-0001-9043.

Descriptors: *Recreational facilities, Eutrophication, Fish, *Texas, Algicides, *Bioassays, Lakes, Recreation, Municipal wastes, *Water reuse, *Reclaimed water, Effluents, Model studies, Municipal water.
Identifiers: *Lubbock(Tex), Algal growth potential, Tilapia, Recreational lakes.

Lubbock, Texas is in the process of building a series of four recreational lakes which will be supplied with reclaimed municipal effluent. Serving in an advisory capacity to the city, the Texas Tech University Water Resources Center constructed a model of the project to ascertain the suitability, for recreational purposes, of municipal effluent that has previously been used for irrigation and allowed to percolate into the underlying aquifer. Algal growth potential studies, water quality analyses bacteriological assays and fish life studies indicate that with proper management, the series of lakes should provide Lubbock and the surrounding area with aesthetically pleasing and desirable recreational facilities.
W75-01853

REMOVAL OF PHENOLS FROM POLLUTED WATERS,
Rutgers-The State Univ., New Brunswick, N.J.
J. S. Zogorski, and S. D. Faust.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 859, $4.75 in paper copy, $2.25 in microfiche. Water Resources Research Institute, New Brunswick, New Jersey, June 1974. 92 p, 8 fig, 36 tab, 56 ref. OWRT A-033-NJ(1). 14-31-0001-4030.

Descriptors: *Phenols, Carbon, Taste, Odor, *Adsorption, *Water treatment, Water pollution, *Activated carbon, *Kinetics, *Equilibrium studies, *Waste water treatment.
Identifiers: *Carbon column treatment process.

Nine granular activated carbons were evaluated for their efficiences to remove phenolic compounds from water. Of these, Columbia LCK carbon has superior adsorption capacities (1.77g 2,4-dichlorophenol per gram carbon) and kinetics of adsorption. Consequently, it was chosen for the equilibrium (adsorption capacity) kinetic, and column studies. In the equilibrium studies 2,4-dichlorophenol and 2,4-dinitrophenol were employed as model compounds to evaluate such variables as (a) contact time, (b) carbon particle size, (c) pH value, (d) temperature, (e) phenol solubility in water, and (f) competitive adsorption. The effect of several variables on the kinetics (i.e., rate) of adsorption of 11 phenolic compounds on Columbia LCK carbon were investigated: (a) rate of stirrer speed, (b) type of phosphate buffer, (c) temperature, (d) pH value, (e) competitive adsorption, (f) carbon particle size, (g) initial phenol concentration, (h) molecular size of the phenol, and (i) substituent in the para position on the phenol ring. Several experiments were performed where phenolic solutions were passed through a fixed bed of carbon. Several variables were investigated: (a) carbon particle size, (b) pH value, (c) contact time (depth of column), (d) volumetric flow rate, (e) initial phenol concentration, and (f) phenolic species. In summary, about 155 experiments were performed from which the data were used to design a carbon column treatment process for the removal of phenols from polluted waters.
W75-01857

CYANIDE DISPOSAL BY OZONE OXIDATION,
Houston Research, Inc., Tex.
R. L. Garrison, C. E. Mauk, and H. W. Prengle.
Available from the National Technical Information Service, Springfield, Va. 22161, as AD-775 152, $5.25 in paper copy, $2.25 in microfiche. Report AFWL-TR-73-212, (1973). 99 p, 33 fig, 7 tab, 10 ref.

Descriptors: *Ozone, *Oxidation, *Waste disposal, *Waste water treatment, Water quality standards, Pilot plants, Laboratory data, Mass transfer, Temperature, Metals.
Identifiers: *Cyanide disposal, *Metal wastes, Electroplating, Iron cyanide, Photographic wastes, Ultraviolet light.

Aqueous cyanide and complex metal cyanide wastes from the Air Force's routine electroplating operations and color photographic film processing require extensive treatment to satisfy stringent water quality standards. No process existed which was effective for the complete destruction of total cyanide influent as high as 100,000 mg/liter, or below one mg/liter, to produce an effluent with total cyanide below the limit of detection. A process was developed by laboratory experimentation. This used ozone for the total destruction of cyanide and metal cyanide complexes. The destruction of concentrated cyanide was limited by mass transfer of ozone from the gas to liquid phase, and the destruction of dilute cyanide was limited by the chemical reaction rate. Mass transfer and kinetic rate constants were determined by experimentation. Ozone alone reacted with the iron cyanide complexes (found in all photographic and electroplating wastes) much too slowly for practical application, but ozone at slightly elevated temperature in the liquid became much more effective, and ozone with ultraviolet light became effective enough to permit the design of a successful system. Using the laboratory data, a pilot scale prototype was designed, fabricated, and operated to destroy actual Air Force cyanide wastes. A conceptual design of a full scale system to treat electroplating waste is included. (Prague-FIRL)
W75-01866

WASTE PLANT CORROSION MUST BE TREATED WITH CARE,
Carboline Co., St. Louis, Mo. Pollution Control Div.
J. R. Lopata, and C. Leutwiler.
Water and Sewage Works, Vol 121, No 5, p 46-47, May, 1974.

Descriptors: *Treatment facilities, *Corrosion control, Protective coatings, *Linings, Industrial wastes, *Waste water treatment, Repairing, Design criteria.

The protection of steel and concrete in waste treatment plants should be a matter of increasing concern to design engineers and operating personnel. These plants have been given the additional burden of processing highly corrosive industrial wastes previously directed into rivers and streams. The South Charleston Waste Treatment Plant in West Virginia is an example of the advantages and long range economics of proper corrosion control planning and execution. Most protective coating systems and tank linings used on steel in this new facility consist of modified phenolic, epoxy-amine, and epoxy-polyamide types. Areas of use included basins, submerged steel, interiors and exteriors of pipes, industrial clarifiers, steel in the aero-accelerator activated sludge basins, and floors of flumes. After ten years of operation, complete repainting of the plant has never been necessary. In some isolated areas the coatings that were damaged mechanically were spot repaired. (Sandoski-FIRL)
W75-01867

DESIGN FOR JOINT TREATMENT OF MUNICIPAL AND PAPER MILL WASTE AT LYNCHBURG, VIRGINIA,
Wiley and Wilson, Inc., Lynchburg, Va.
W. H. Clingenpeel, and M. K. Jones.
Water and Sewage Works, Vol 121, No 4, p 12, 14, 18-19, 24-25, April 30, 1974. 3 fig, 6 ref.

Descriptors: *Treatment facilities, *Design criteria, *Sewage treatment, Pulp wastes, Municipal wastes, Pulp and paper industry, *Virginia, *Waste water treatment.
Identifiers: *Joint municipal-industrial waste treatment.

In order to upgrade the existing primary treatment facility in Lynchburg, Virginia to secondary treatment, the city was requested to consider joint treatment with the Mead Corporation's Paperboard Plant. In complying with this request, the investigation of joint treatment of pulp and paper wastes with municipal wastes involved the following: a close evaluation of the existing Lynchburg treatment facilities: a study of the Mead Corporation's waste sources and characteristics; an investigation of joint treatment results elsewhere. Also included were: study of combined Mead and Lynchburg waste treatability; the development of a joint treatment process concept; and, design of the joint treatment facility. The Lynchburg Project has demonstrated that in many instances municipal and industrial wastes are compatible for joint treatment that is mutually beneficial. (Sandoski-FIRL)
W75-01868

MECHANICAL SEPARATION PROCESSES,
Monash Univ., Clayton (Australia). Dept. of Chemical Engineering.
I. H. Lehrer.
PACE, Vol 27, No 2, p 21-26, February, 1974. 7 fig, 2 tab, 6 ref.

Descriptors: *Separation techniques, *Design criteria, Equipment, Equations, *Waste water treatment, Water reuse, Sedimentation, Filtration, Mathematical studies, Analytical techniques.
Identifiers: *Mechanical separation, Electrical separators.

Heterogeneous systems which consist of continous phases and dispersed phase and which may be treated by mechanical separation processes are discussed. Such separation is required for preparation of raw materials and purification of products in the complete process. Applications of mechanical separation pertain to waste treatment and water reuse. Theoretical derivation from basic principles are given as a guide in design of equipment. These derivations are shown to be fallible and often the purchaser of such equipment must expect to make modifications after installation. Equations are given sedimentation, filtration, and electrical separators. (Prague-FIRL)
W75-01875

COST OF THERMAL EFFLUENT STANDARDS FOR POWER PLANTS,
Stanford Univ., Calif. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5G.
W75-01878

ULTRAPURE WATER AND REVERSE OSMOSIS TECHNOLOGY,
Microsystems International Ltd., Ottawa (Ontario).
R. Kohout.
Solid State Technology, Vol 17, No 6, p 60-65, June 1974. 4 fig, 2 tab, 14 ref.

Descriptors: *Reverse osmosis, *Water purification, Evaluation, Reviews, Treatment facilities, Operations, Performance, Coagulation, Filtration, Ion exchange, Waste water treatment.
Identifiers: *Semiconductor devices.

Treatment plants incorporating the reverse osmosis process are capable of producing water of greater purity. Evaluated are the attributes of the new technology, the problem areas experienced in the field, and the contribution of reverse osmosis to the state-of-art in production of high-purity water. Operating results of two water treatment systems representing two technologies (classical and RO) are compared for product water purity and effect on fabrication of various generations of semiconductor devices. It is suggested that the old concept of what constitutes ultrapure water may have to be reinvestigated. (Sandoski-FIRL)
W75-01890

ADSORPTION-BIOOXIDATION PROCESS FOR REMOVAL OF ORGANIC AND NITROGENOUS COMPOUNDS FROM WASTEWATERS,
Ontario Research Foundation, Sheridan Park. Dept. of Applied Chemistry.
F. Besik.
Water and Pollution Control, Vol 112, No 6, p 24-29, 37-39, June, 1974. 5 fig, 1 tab.

Descriptors: *Waste water treatment, *Municipal wastes, *Organic compounds, *Nitrogen compounds, Adsorption, Canada, Ammonia, Energy, Activated carbon, Flow, Pilot plants, Wastes, Water reuse.
Identifiers: *Adsorption-biooxidation process, Sewage flow rates.

A new process for treatment of domestic and municipal waste waters removes suspended and dissolved organic and nitrogenous compounds from waste waters in one stage without addition of chemicals or an external source of energy. The process was tested on a pilot scale with sewage flow rates from 7000 to 10,000 GPD. The name of this process is Adsorption-Biooxidation or A-B and refers to action whereby the activated carbon is not consumed and does not require external reactivation. The flowsheet is described; a 96-day virtually unattended and maintenance-free operation is provided. Except for ammonia, all contaminants were efficiently removed from the start up of the plant. Ammonia was efficiently removed after 10 to 14 days of system operation. Applications of the A-B process are in water renovation and reclamation, particularly for the design of small to medium sized package systems. (Prague-FIRL)
W75-01891

PROCESS AND APPARATUS FOR TREATING WASTES BY A COMBINED ACTIVATED SLUDGE AND BIOLOGICAL FILTER BED,
J. Tymoszczuk.
Canadian Patent 948,335. Issued May 23, 1974. Patent Office Record, Vol 102, No 22, p 94, May, 1974.

Descriptors: *Patents, *Waste water treatment, *Activated sludge, Equipment, Sludge removal, Aeration, *Filters, *Biological treatment, *Filtration.
Identifiers: Biological filter bed, Backwashing.

A process is described for treating wastes in which the wastes are flowed gravitationally, in sequence, through an activated sludge compartment. Next they flow through a single layer biological filter bed compound of filter media which is aerated continuously from the bottom. The same air is used to aerate the activated sludge compartment containing a closed sludge concentrator. This permits the removal of excess biological sludge. The concentrator is used to remove backwash effluent when the biological filter bed is being backwashed. (Prague-FIRL)
W75-01892

APPARATUS FOR FRACTIONATING FLUID SUSPENSIONS,
Canadian Ingersoll-Rand Co., Ltd., Montreal (Quebec). (assignee)

D. L. G. Young.
United States Patent 3,814,244. Issued June 4, 1974. Official Gazette of the United States Patent Office, Vol 923, No 1, p 153-154, June, 1974. 1 fig.

Descriptors: *Patents, *Fluids, *Suspension, Equipment, *Waste water treatment, *Distillation.
Identifiers: *Rotary drive shafts.

A fractionating apparatus comprises a plurality of annular walls spaced one inside the other. At least one of these walls is a screen. The apparatus includes rotary drive shaft means having a portion connectible to a driving means and a portion eccentric to such connectible portion. One of the annular walls is connected to the eccentric portion of the drive shaft means to be orbitally driven during the driven rotation of the drive shaft means. (Prague-FIRL)
W75-01893

HIGH CAPACITY FLUID TREATER EMPLOYING CONCENTRATED ELECTRIC FIELDS,
For primary bibliographic entry see Field 5F.
W75-01895

ELECTROKINETIC AND CHEMICAL ASPECTS OF WATER FILTRATION,
IIT Research Inst., Chicago, Ill.
W. Wnek.
Filtration and Separation, Vol 11, No 3, p 237-238, 240-242, May/June, 1974. 3 fig, 54 ref.

Descriptors: *Filtration, *Colloids, Physical properties, Chemical properties, Zeta potential, Hydrogen ion concentration, Surfactants, Ions, Efficiencies, *Kinetics, *Waste water treatment, *Separation techniques.

The role of electrokinetic and chemical phenomena in liquid filtration, particularly water filtration, is discussed in terms of colloid chemistry. The effects of surfactants, pH, and ionic strength on filter efficiency are explained. These provide a basis for selecting conditions which enhance operation. (Sandoski-FIRL)
W75-01896

END-OF-PIPE TREATMENT AND DISPOSAL DOMINATE CONFERENCE.
Tappi, Vol 57, No 6, p 22-24, June, 1974.

Descriptors: *Conferences, *Environmental effects, *Waste disposal, Water reuse, Recycling, Biological treatment, Reverse osmosis, Sludge disposal, Pollution abatement, *Waste water treatment, *Louisiana.
Identifiers: *New Orleans(La).

The 1974 Environmental Conference held in New Orleans, Louisiana drew a record attendance of over 400 delegates. Reports included alternates for capture and disposal of pollutants for air emission control, color reduction, biotreatment, sludge disposal, and local environment impact. Only two of the twenty technical papers dealt in a direct manner with in-plant water reuse and recycle. The main theme of this conference was the disposal of the residues which cannot be eliminated by in-plant methods. (Sandoski-FIRL)
W75-01897

LAND DISPOSAL...WHAT'S THE REALISTIC VIEW,
Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.
H. L. Michel, P. H. Gilbert, and H. K. Creed.
Water and Wastes Engineering, Vol 11, No 6, p 30-35, June, 1974. 6 tab.

Descriptors: Investigations, *Land management, Waste water treatment, *Waste disposal, Sites, Landfills, Performance, Cost-benefit analysis, Environmental effects, *California, *Water reuse.
Identifiers: Land application, *San Francisco Bay area.

One of the first comprehensive study programs in the field of land application has been completed with facts emerging to offer a much clearer outline of the concept. The study area encompassed the 12-county San Francisco Bay-Delta Area of California, approximately 10,000 square miles. The application areas were to be drawn from the 12-county study area and from an additional 27 counties in the central portion of California. To approach the problem five broad areas were explored: site selection, process effectiveness, benefits, environmental impact and unknown problems, and implementation and costs. Results of these investigated topics are disclosed. (Sandoski-FIRL)
W75-01898

SEWERAGE TREATMENT SYSTEM,
Koehler-Dayton, Inc., New Britain, Conn. (assignee)
R. E. Delaney, and A. H. Cornish.
United States Patent 3,815,159. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 395, June 11, 1974. 1 fig.

Descriptors: *Sewage treatment, *Patents, *Treatment facilities, Equipment, Waste water treatment.
Identifiers: Toilets.

A sewerage treatment system comprises a toilet, a bathing facility, first and second recirculating tanks each including filtering media, means for selectively directing the effluent flushed from the toilet into the receptacle compartment of either recirculating tank, means for selectively directing the effluent from the bathing facility into either recirculating tank, means for selectively draining either recirculating tank, means for selectively recirculating the liquid in the filtrate compartment of either recirculating tank to the toilet for flushing, means for operating the system in a first mode of operation, and means for alternately operating the system in a second mode of operation. Included also are means for draining the first recirculating tank and for switching the system from the first mode of operation to the second mode of operation. (Sandoski-FIRL)
W75-01901

FILTER FOR REMOVING SUCH PARTICLES AND MISCELLANEOUS DIRT AS CONTAINED IN A FLUID,
T. Hamano.
United States Patent 3,815,341. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 442-443, June 11, 1974. 1 fig.

Descriptors: *Patents, *Filters, Equipment, Filtration, Construction materials, *Waste water treatment, Fibers.

A filter consists of a base member, which is a coarsely woven or knitted fabric or reticulated material with flocked fibers on the surface. The process of preparation consists of first applying an adhesive onto the base member, in a manner not to fill the meshes, and then applying the flock fibers. The adhesive is preferably applied in sufficient amount to give a layer of 0.3 mm-0.6mm, with a base cloth which is removed after the fibers have been fixed. (Sandoski-FIRL)
W75-01902

THIN WATERFALL SEPARATING AND SCREENING APPARATUS,
Bauer Bros. Co., Springfield, Ohio. (assignee)
M. E. Ginaven.
United States Patent 3,815,740. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 547, June 11, 1974. 1 fig.

Descriptors: *Patents, *Separation techniques, *Screens, Solid wastes, Slurries, Equipment, Waste water treatment, Water pollution control.

This invention is directed to screen units and screen assemblies applied primarily to the separation and reclamation of solids, particularly fibrous solids, from a fluid slurry. Each embodiment of the invention is characterized by a screen section or assembly of screen sections having in connection a feed system including a variable flow control means. The controls provided enable a directed initial feed of a slurry in a thin waterfall form and in a manner whereby the initial engagement of the slurry with the flow surface can be variably placed with an impact effect. The structural features provided enable oily, fatty and like adherent substances to be optimally separated from the solids content of the slurry in movement to and over the flow surface provided by the embodiments. (Sandoski-FIRL)
W75-01906

WASTE DISINTEGRATOR,
General Signal Corp., New York. (assignee)
E. H. Bradley.
United States Patent 3,815,827. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 570-571, June 11, 1974.

Descriptors: *Patents, *Waste water treatment, Treatment facilities, Equipment, Valves, Flow control, Waste disposal.

A waste disintegrator for comminuting solid particles in a fluid has a transverse wall in its housing. The transverse wall has a central opening through which the fluid is channeled and a comminuting means is mounted in that opening. A fluid bypass is formed in the transverse wall in a peripheral area. Covering this opening is a flapper valve that is pivotally secured to the downstream side of the transverse wall. The flapper valve has one of its ends secured on a shaft that passes through a housing wall of the disintegrator and to this shaft at its end is attached an arm. A coil spring that has one of its ends secured to the housing and its other to one end of the arm provides a relatively constant spring tension on the arm. This urges the flapper door to remain in its closed position or to return to its closed position when the differential pressure across the transverse wall diminishes to a predetermined level. Also mounted on the wall housing is a microswitch which is part of a warning signal circuit. The switch is in engagement with the arm when the flapper door is closed and it is under this condition that the switch is open. As increased differential pressure forces the flapper door open, the arm moves away from the switch closing the circuit, which in turn activates the warning signal. (Sandoski-FIRL)
W75-01909

FEASIBILITY OF OZONE DISINFECTION OF SECONDARY EFFLUENT,
Illinois Inst. for Environmental Quality, Chicago.
E. Greening.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-228 524, $3.75 in paper copy, $2.25 in microfiche. Report IIEQ74-3, January, 1974. 40 p, 10 fig, 13 tab, 33 ref.

Descriptors: *Ozone, *Effluents, *Waste water treatment, Chlorine, Viruses, Flotation, Illinois, *Tertiary treatment, *Feasibility studies, *Disinfection, *Viricides.
Identifiers: Ozone-iron induced flotation, Secondary effluents.

The use of ozone in treating secondary waste water effluents was studied. The use of ozone rather than chlorine for secondary disinfection has the advantage in removal of viruses; ozone was more effective as a viricide than chlorine. Higher levels of ozone were required for disinfection and

reduction of the parameters measured in the study than previously expected. Also, ozone-iron induced flotation was not as efficient as was expected. Although ozone was a good viricide, its use as a disinfection method for secondary treated effluents was not recommended for Illinois. (Prague-FIRL)
W75-01910

COSTS OF DISSOLVED AIR FLOTATION THICKENING OF WASTE ACTIVATED SLUDGE AT MUNICIPAL SEWAGE TREATMENT PLANTS,
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
W. F. McMichael.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-226 582, $3.25 in paper copy, $2.25 in microfiche. February, 1974. 9 p, 4 fig, 2 ref.

Descriptors: *Capital costs, *Operating costs, Operation and maintenance, *Maintenance costs, Labor, Polymers, Electric power costs, Equipment, Treatment facilities, Waste water treatment, *Activated sludge, *Flotation.
Identifiers: Polymer dosage, Polymer costs.

Presented are estimated capital and operating costs and operation and maintenance labor man hours, associated with flotation thickening. Equipment supplied by Komline-Sanderson Engineering Corporation and Rex-Chainbelt Incorporated was used for cost analysis. Capital costs were determined by loading rates, operating schedules, and excess capacity factors. Operation and maintenance costs were made up principally of labor, electric power, and chemical (polymer price and dosage) costs. (Prague-FIRL)
W75-01911

ADSORPTION OF MBAS FROM WASTEWATERS AND SECONDARY EFFLUENTS,
Rutgers - the State Univ., New Brunswick, N.J.
D. Rickert, and J. V. Hunter.
Journal Water Pollution Control Federation, Vol 46, No 5, p 911-919, May 1974. 5 fig, 2 tab, 13 ref.

Descriptors: *Adsorption, *Effluents, *Waste water treatment, Activated carbon, Total organic carbon, New Jersey, Analytical techniques, Equations, *Linear alkylate surfonates.
Identifiers: *Freundlich equation, *Methylene blue active substances, Secondary effluents.

In most municipal waste waters, methylene blue active substances (MBAS) make up a significant part of the potentially adsorbable, dissolved organics. This study was done to establish the characteristics of MBAS adsorption onto activated carbon from waste water and secondary effluent. On the basis of adsorption behavior observed, there are three groups of MBAS. One group is observed at low carbon doses, contains the bulk of the total MBAS, and is readily adsorbable. A second group is noted at intermediate dosages, contains little of the total MBAS and is poorly adsorbable. At high carbon dosages a third group appears, again making up only a small portion of the total MBAS, and is essentially nonadsorbable. Freundlich plots of the groups exhibit two stages, with each high concentration (lower carbon dose) segment corresponding closely to the range of readily adsorbable MBAS. By the use of Freundlich equation constants, the carbon dosages necessary to reduce MBAS over defined concentration ranges were calculated for the readily adsorbable segment of each plot. The results indicated that organic materials in the systems have a strong competitive effect on the adsorption of MBAS. It is postulated that the greater part of MBAS in waste water is undegraded or slightly degraded linear alkylate sulfonates (LAS), whereas in secondary effluents the bulk of the MBAS is a mixture of partially oxidized LAS. (Shaffer-FIRL)
W75-01913

OPERATIONAL CONTROL PROCEDURES FOR THE ACTIVATED SLUDGE PROCESS, PART I, OBSERVATIONS,
National Field Investigations Center-Cincinnati, Ohio.
A. W. West.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-228 741, $3.25 in paper copy, $2.25 in microfiche. April, 1973. 14 p, 11 fig.

Descriptors: *Aeration, *Control systems, Sludge, *Quality control, Analytical techniques, *Waste water treatment, *Activated sludge, Performance, *Aerated lagoons, Operations.
Identifiers: Aeration tanks, Final clarifiers, Clarification.

Aeration tanks and final clarifiers are described and illustrated. Physical characteristics which help identify sludge quality and process are discussed. Particular clues indicate the type of control adjustments needed to achieve optimum plant performance. These findings supplement the results of more specific control tests, which dictate direction and magnitude of the essential control adjustments. (See also W75-01916) (Prague-FIRL)
W75-01915

OPERATIONAL CONTROL PROCEDURES FOR THE ACTIVATED SLUDGE PROCESS, PART II, CONTROL TESTS,
National Field Investigations Center-Cincinnati, Ohio.
A. W. West.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-228 742, $3.75 in paper copy, $2.25 in microfiche. April, 1973. 22 p, 3 fig.

Descriptors: *Control systems, *Quality control, Centrifuge, *Sludge, *Tests, Turbidity, Dissolved oxygen, Discharge, Aeration, Measurement, *Waste water treatment, *Activated sludge.
Identifiers: Final clarifier, Calculations, Final effluent quality, Sludge blanket, Sludge wasting, Aeration tanks, Settleometers.

Control tests reveal sludge quality, process status, and final effluent quality at intervals throughout each 24-hour cycle. Results of settleometer, centrifuge, and final clarifier sludge blanket tests are used for calculations of solids distribution ratios between the aeration tanks and the final clarifiers, as well as sludge detention time in the final clarifiers and other factors which influence process performance. By coordinating results of the full test series--flow records, turbidity, and dissolved oxygen test data--one determines the return sludge flow, excess sludge wasting and air discharge rates which are necessary to maintain or restore excellent final effluent quality. (See also W75-01915) (Prague-FIRL)
W75-01916

FILTER PRESS FOR SLUDGE TREATMENT,
Y. Matsuno, K. Nishi, S. Kawazoe, and K. Uratsuka.
Technical Review, Vol 11, No 1, p 49-60, February, 1974. 15 fig, 4 tab, 3 ref.

Descriptors: *Dewatering, Equipment, *Sludge treatment, *Filters, Water pollution control, Rivers, Sludge, Vacuum, Industrial wastes, Municipal wastes, *Waste water treatment, Water Pollution Control Act, Centrifuges, Municipal water.
Identifiers: *Vacuum press, *Filter press, Sludge cake, Japan.

Dewatering equipment now available include not only the vacuum press and centrifuges, but also the filter press appears to be the most effective in dewatering performance of these types of equipment. Demand for the filter press is due to the future Act of Water Pollution Control which will prohibit the discarding into rivers of the sludge produced in the course of treatment of both industrial and municipal waters. The Act will also prohibit discarding the sludge cake containing a large amount of water (over 85 percent). In addition, when sludge cake is treated by burning, the lower its water content, the lower the treating costs. The filter press was developed on the basis of the technique developed for the soy bean sauce press now under mass production. It was planned to treat every kind of sludge in order to get a lower water content in the sludge cake. Water content has been reduced to below 70 percent, a level previously unattained by other types of dewatering equipment. (Prague-FIRL)
W75-01917

OZONE TREATMENT FOR POTABLE WATER,
For primary bibliographic entry see Field 5F.
W75-01918

THE DEVELOPMENT OF A TEST FOR THE POTABILITY OF WATER TREATED BY A DIRECT REUSE SYSTEM,
Cincinnati Univ., Ohio.
For primary bibliographic entry see Field 5A.
W75-01919

PLASTIC-MEDIUM TRICKLING FILTERS FOR BIOLOGICAL NITROGEN CONTROL,
Dow Chemical Company, Midland, Mich. Environmental Control Systems.
G. A. Duddles, S. E. Richardson, and E. F. Barth.
Journal Water Pollution Control Federation, Vol 46, No 5, p 937-946, May, 1974. 8 fig, 9 tab, 9 ref.

Descriptors: *Trickling filters, *Biochemical treatment, *Nitrification, *Waste water treatment, Bacteria, Biochemical oxygen demand, Toxicity, Chlorination, Design criteria, Chemical treatment, Nitrogen, Chemcontrol.
Identifiers: Plastic-medium trickling filters.

In evaluating the effects of waste water discharged to a receiving body, increasing attention is being paid to Nitrogenous Oxygen Demand. Many efficient conventional biological treatment facilities are capable of high removals of BOD (90 percent and up) yet these same facilities usually remove no more than 10 to 60 percent of the NOD. These NOD-rich effluents play a major role in the oxygen balance of receiving waters. The evaluation of controlling parameters, operational characteristics, basic design criteria, and economicis of using plastic media trickling filter nitrification as a method of NOD reduction are described. Test results show that the plastic-medium trickling filter is a stable unit process producing high quality effluent. Final clarification is not always necessary after this process and therefore the operation may be economically competitive with other physico/chemical and biological methods of NOD reduction. (Shaffer-FIRL)
W75-01920

POLYCHLORINATED BIPHENYLS IN TREATMENT PLANT EFFLUENTS,
Wisconsin Dept. of Natural Resources, Madison.
For primary bibliographic entry see Field 5A.
W75-01921

CHLORINE RESIDUALS IN TREATED EFFLUENTS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
V. L. Snoeyink, and F. I. Markus.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-227 268, $4.25 in paper copy, $2.25 in microfiche. Illinois Institute for Environmental Quality Report 73-12 August, 1973. 59 p, 7 fig, 8 tab, 37 ref.

Descriptors: *Chlorine, *Effluents, *Waste water treatment, Treatment facilities, Decay, Sulfur compounds, Activated carbon, Waste water, *Illinois, Streams, Waste disposal.
Identifiers: *Zero discharge, Residual chlorines, Sunlight exposure.

The occurrence and effect of residual chlorine in treated waste water effluents were discussed. A field study which involved analysis of effluents from 20 waste water treatment plants in Central Illinois showed total chlorine residuals ranging from 1 to 5 mg/liter. Most of these plants discharged to streams which have 7-day 10-year low flows of zero. A study was made of the rate of decay of residuals in receiving waters, and this rate proved to be an important function of the type of residual (free or combined) and the amount of sunlight. Free chlorine in secondary effluent exposed to bright sunlight decayed most rapidly. Chlorine residual can be eliminated by chemical reduction of the residual either by sulfur compounds (SO2, HSO2, SO3) or activated carbon. (Prague-FIRL)
W75-01922

VACUUM DISTILLATION/VAPOR FILTRATION WATER RECOVERY,
General American Transportation Corp., Niles, Ill. General American Research Div.
R. J. Honegger, G. A. Remus, and E. K. Krug.
Available from the National Technical Information Service, Springfield, Va 22161 as N73-32367, $5.75 in paper copy, $2.25 in microfiche. Interim Report for Phases I and II, GARD Project No 1528, July, 1973. 104 p, 28 fig, 14 ref. NAS 8-27467.

Descriptors: Vacuum, *Filtration, *Water reuse, Oxidation, Evaporation, Condensation, Equipment, Potable water, Tests, Analytical techniques, Organic carbon, Ammonia, *Distillation, Water quality, Turbidity, *Waste water treatment, Hydrogen ion concentration, Gases.
Identifiers: *Vacuum distillation, *Vapor filtration, Zero gravity.

A vacuum distillation/vapor filtration (VD/VF) water recovery system was designed, fabricated, and tested. The system employs vacuum distillation, vapor-phase catalytic oxidation, and condensation as the basic processes for recovering potable water from urine. Both the evaporator and condenser utilize a rotating impeller to create an artificial gravity for separation of liquid and vapor in zero gravity. Each impeller is driven through a magnetic coupling, thus eliminating shaft seals. A six-day performance test indicated good system thermal efficiency. Water recovered from urine was of good quality as determined by selected analyses. Daily analyses of recovered water were made. Total organic carbon was less than 12 mg/liter, pH varied between 6.0 and 6.9, turbidity was below one Jackson Unit, and ammonia concentration was less than 1 mg/liter. (Prague -FIRL)
W75-01923

MATERIALS FOR WET OXIDATION PROCESSING EQUIPMENT (SHIPBOARD),
National Materials Advisory Board (NAS-NAE), Washington, D.C.
For primary bibliographic entry see Field 8G.
W75-01924

SURVEY AND EVALUATION OF MARINE SANITATION DEVICES,
Henry (J. J.) Co., Inc., Moorestown, N.J.
M. W. Hooper, and J. R. Piskura.
Available from the National Technical Information Service, Springfield, Va. 22161 as AD-770 327, $4.75 in paper copy, $2.25 in microfiche. June, 1973. 43 p, 70 fig, 15 tab, 85 ref.

Descriptors: *Sanitation, Recreation, *Evaluation, Federal jurisdiction, Installation, Treatment, Capital costs, Ships, Operating costs, *Surveys, Systems analysis, *Waste water treatment, Waste treatment.
Identifiers: *Marine sanitation devices, Sample vessels, Commercial watercraft.

A study was conducted available marine sanitation devices (MSD) and a technical evaluation, was made of how these systems will interface with 14 representative vessels. The objective was to perform an extensive survey and to provide technical description of the various individual sanitation devices currently marketed or under development for installation onboard federal, commercial, and/or recreational watercraft. Also, an evaluation of the applicability and potential impact of marine sanitation concepts and individual systems relative to these vessels was made. This evaluation considered the interactions and impact of the concepts and systems on the major installation constraints, operating characteristics, and capital/operating costs of each representative vessel. (Prague-FIRL)
W75-01927

APPLICATION OF NASA-DEVELOPED TECHNOLOGY TO THE AUTOMATIC CONTROL OF MUNICIPAL SEWAGE TREATMENT PLANTS,
Southwest Research Inst., San Antonio, Tex.
L. L. Hiser, and W. R. Herrera.
Available from the National Technical Information Service, Springfield, Va. 22161 as N74-11903, $3.75 in paper copy, $2.25 in microfiche. November, 1973. 28 p, 8 fig, 6 tab, 4 ref. NAS 1-11726.

Descriptors: *Instrumentation, Technology, Municipal wastes, *Sewage treatment, Clarification, Activated sludge, *Automation control, *Waste water treatment, Treatment facilities.
Identifiers: Commercial technology application, Process control mechanisms, F/M ration(Food to sludge mass), Sensors, *Technology transfer, Clarification.

A search was made of NASA-developed technology and commercial technology for process control sensors and instrumentation which would be applicable to the operation of municipal sewage treatment plants. Process control concepts were formulated that incorporated specific items into systems to automatically operate municipal sewage treatment plants. A preliminary design of the most promising concept was developed into a process control scheme for an activated sludge treatment plant. This design included process control mechanisms for maintaining constant food to sludge mass (F/M) ratio, and for such unit processes as primary sedimentation, sludge wastage, and underflow control from the final clarifier. (Prague-FIRL)
W75-01928

UPDATED WATER AND SEWERAGE PROGRAM.
Greene County Planning Dept., Cairo, N.Y.
Available from the National Technical Information Service, Springfield Va. 22161, as PB-226 697, $3.25 in paper copy, $2.25 in microfiche. Final Report No. GCPD 4-5, December, 1973. 20 p. CPA-NY-02-36-1001.

Descriptors: *Sewage treatment, *Sewerage, *Capital costs, *Waste water treatment, *Water supply, Operating costs, Financing, Priorities, Growth rates, Government finance, *New York, Economic feasibility, Effluents, Groundwater.
Identifiers: *Greene County, *Cairo(NY), Waste water facilities, Water facilities, Developable land.

For 13 areas of Greene County, N.Y., a description of what wastewater facilities are to be constructed and a brief summary of the conditions which necessitate the proposed project are presented along with the estimated cost, financing, and operating costs. The same is done for water facilities for 5 areas within the county and the county as a whole. Project importance in relation to other county projects is indicated by year proposed for start of construction. Some criteria used in determining these rankings were: projected growth rate for area to be served, demand for developable land, existing or potential health hazards, history of existing problems, condition of present facilities, adequacy of water supply, and proximity and importance of ground water/surface water. The suggested timetable is dependent on the availability of federal and state aid, without which many of the projects are economically unfeasible. Changes in mandated systems or standards for effluents could have a significant effect on the type of project proposed, its cost, and data of implementation. (Diefendorf-North Carolina)
W75-01931

SAFE TO DRINK TREATED WASTEWATER.
American Water Works Association, New York.
Civil Engineering, Vol 44, No 8, p 63-64, August, 1974.

Descriptors: *Chemical wastes, *Reclaimed water, *Potable water, *Waste water treatment, *Water quality, Domestic water, Treatment facilities, Environmental sanitation, Water utilization, Public health, Waste treatment, Water purification, Water pollution, Viruses, Epidemiology, Industrial wastes, Sewage, Activated carbon, Water quality control, Legal aspects, Filters, Risks, *Potable water.
Identifiers: Legal liability, Chanute, Kansas.

Highlights of the American Water Works Association 1974 meeting are set forth. Direct reuse of treated waste water will be practical when and where necessary, regardless of the state of waste water treatment. Whether recycled waste water is reused directly for municipal supply is a question of cost and relative risk, but it is up to the public, legislators, and the courts to decide what risks are acceptable. In addition, toxicity is not absolute, and the public's collective susceptibility forms the standard bell-shaped statistical curve. In making decisions on risks, water composition must be ascertained. Viruses are the water pollutant most discussed, but others see chemical pollutants as a greater concern. Fortunately, good methods exist for removing particulates, such as filtration through activated granular carbon, which dissolves chemical pollutants. Questions of legal liability make water utilities cautious about using treated waste water. The courts say utilities must exercise care and vigilance, but if a utility does not know a pollutant's effect, the utility is unlikely to be held responsible. Recycling for non-municipal uses such as irrigation, industrial processes, and power plant cooling is fairly common, but cities will not use it for drinking unless supply/demand factors force them to do so. (Grden-North Carolina)
W75-01938

TWO AWT PLANTS FOR FITCHBURG, MASS.,
Camp, Dresser and McKee, Boston, Mass.
W. H. Parker, and W. F. Callahan.
Civil Engineering-ASCE, Vol 44, No 9, p 90-93, September, 1974. 4 fig.

Descriptors: *Waste water treatment, *Waste water, *Water treatment, *Waste treatment, *Massachusetts, Aeration, Activated carbon, Environmental sanitation, Industrial wastes, Municipal wastes, Water pollution, Effluents, Sewage, Pollutants, Waste dilution, Waste disposal, Water utilization, Water policy, Water management, Water quality, Water resources, Activated sludge, Sludge treatment.
Identifiers: *Fitchburg(Mass), Two-stage activated sludge plant.

Fitchburg, Massachusetts, a highly industrialized city of 43,000 must go to advanced waste water treatment (AWT) to comply with requirements established for the Nashua River by the Massachusetts Water Resources Commission. It is building two AWT plants concurrently, each em-

ploying different processes. In East Fitchburg is the tworstage activated sludge plant with phosphate removal and nitrification for treating domestic waste water, and the second plant, in West Fitchburg, is a physical-chemical plant using activated carbon to treat the industrial waste waters of two large paper companies that contribute 90% of the pollutional load. The city's sewerage system was incapable of transporting the generated volume of waste water to one site, and transportation of waste water would have been costly, thus two sites were selected. One feature of the East plant is that the two-stage aeration process can be converted to a conventional activated sludge process by splitting the flow prior to the first-stage aeration. To convey waste water to the West plant, pumping and sewer facilities are being constructed by and for the paper companies, and the plant is also designed to handle future waste water flow of nearby areas. (Grden-North Carolina)
W75-01939

WASTEWATER TREATMENT FOR SMALL COMMUNITIES, PART TWO,
California Univ., Davis. Dept. of Civil Engineering.
G. Tchobanoglous.
Public works, Vol 105, No 8, p 58-62, August, 1974. 1 fig, 5 tab, 11 ref.

Descriptors: *Treatment facilities, *Wastewater treatment, *Design criteria, *Waste treatment, *Operation and maintenance, Water quality control, Water quality, Water pollution treatment, Quality control, Sludge treatment, Trace elements, Water quality standards, Operating costs, Maintenance, Operations, Facilities, Water purification, Waste dilution, Design, Annual costs.
Identifiers: *Design considerations.

This last of a two-part series concerning small wastewater treatment plant management focuses on special design considerations, including incoming water characteristics, secondary settling tanks design, plant control, maintenance, and power requirements. While most wastewater will support biological growth, organism characteristics are important, so water conditions promoting filamentous organisms must be identified. Process control is essential in small plants due to manpower limitations, and processes should be evaluated in relation to the consequences of a temporary power shortage. To assess the economic feasibility of alternative processes, costs estimates based on economic criteria must be made. A true evaluation of alternatives must be based on total annual costs. Data concerning estimated capital costs, annual manpower requirements, annual operation and maintenance costs, and total unit and annual costs for alternative treatment processes with a design flow of 1.0 mgd is presented. Over the past 20 years, numerous processes suitable for use in small plants have been developed, but since local conditions vary, there is no best management system. Selection must be based upon effluent requirements, wastewater characteristics, budget limitations, costs, and impact upon the local community. (See also W75-01758) (Grden-North Carolina)
W75-01944

INVESTIGATION OF METHODS FOR DETERMINING OPTIMUM POWDERED CARBON AND POLYELECTROLYTE DOSAGES IN MILITARY WASTEWATER TREATMENT SYSTEMS,
Calspan Corp., Buffalo, N.Y.
L. K. Wang.
Available from the National Technical Information Service, Springfield, Va 22161 as AD-773 633, $5.75 PC, $2.25 MF. Project Report No ND-5296-M-5, November 1973. 110 p, 108 ref, 21 fig, 26 tab. DAAK 02-73-C-0206.

Descriptors: *Waste water treatment, *Carbon, Adsorption, *Polyelectrolytes, *Coagulation, *Filtration, *Optimization, Analytical techniques, Diatomaceous earth.
Identifiers: Detergent analysis, Field test kit, Chemical dosages determination charts.

Laboratory investigations were conducted to optimize the controlling parameters of a wastewater treatment system involving powdered carbon adsorption, polymer coagulation and diatomite filtration. The mechanisms of the treatment system were also researched and presented. Analytical studies were conducted to develop the methods and a field test kit necessary for determining the nature and concentration of pollutants likely to be present in wastewater generated at field laundries, showers, and kitchens. The test method and the test kit developed are designed for use in the field by military personnel with limited training to provide guidance for determining the optimum carbon-polymer dosages. Instructions and examples for chemical dosage determination were also provided.
W75-01958

VORTEX SUPPRESSION IN STILLING POND OVERFLOW,
Jyoti Ltd., Baroda (India).
Y. R. Reddy, and J. Pickford.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 100, No HY11, Proceedings Paper 10969, p 1685-1698, November 1974. 6 fig, 12 ref, 3 append.

Descriptors: *Baffles, *Vortices, *Submergence, *Hydraulic models, *Laboratory tests, Boundary layers, Hydraulics, Overflow, Storm water, Pollution abatement, Air entrainment, Depth, Water pollution, Storms, Detention reservoirs, Discharge(Water), *Settling basins, Waste water treatment.
Identifiers: Scale effects.

Four siphons of square section with sides 24 mm (0.95 inch), 38 mm (1.5 inches), 50 mm (1.2 inches), and 62 mm (2.4 inches) were tested in a model stilling pond. The dimensionless critical submergence over the siphon decreased with increase in siphon size and for a given siphon, the improvement in critical submergence varied with the baffle position along the horizontal and vertical axis of the stilling pond. The critical submergence increased in the distance of the baffle from the siphon; results with all siphons suggested that the best location for the vortex suppression is with the baffle situated at one diameter from the siphon. The optimum submersion of the baffle to prevent vortex formation was greatest for the 24 mm siphon and decreased with increase in the siphon size. A theoretical equation suggested the functional relationship between the vorticity responsible for air entrainment and variables. (Adams-ISWS)
W75-01994

CURRENT STATUS OF THE EFFLUENT DECOLORIZATION PROBLEM,
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
I. Gellman, and H. F. Berger.
Tappi, Vol 57, No 9, p 69-73, Sept. 1974. 24 ref.

Descriptors: Treatment facilities, *Color, *Pulp wastes, Waste treatment, *Bleaching wastes, *Waste water treatment, *Recycling, *Water reuse, Water conservation, Pollution abatement, Activated carbon, Adsorption, Lime, Chemical precipitation, Organic loading, Separation techniques, Membrane separation processess, Semipermeable membranes, Closed conduits, Oxygen, Sodium chloride, Colorimetry.

A broad assessment is made of current knowledge on the definition and control of color bodies in pulping and bleaching effluents. A review is presented of methods for determining color intensity, sources and distribution of effluent color loads, and levels of water color changes that might be objectionable to human observers. Suggested areas for further investigations include internal controls of color loading not requiring extensive technological change, such as more extensive pulp washing, detection and control of intermittent losses, prevention of evaporator carry-over, and recycling of evaporator boil-outs. Other control measures that do require technological changes are also discussed, including oxygen bleaching coupled with recycling, intensified intrastage recirculation and precipitation of organic matter, resin separation of color, the Rapson closed-cycle salt recovery process, activated carbon adsorption, and semipermeable membrane separation. Large-scale studies of lime precipitation may offer modifications aiming at complete color removal technologies that could be tailored to the needs of individual mills. (Sykes-IPC)
W75-02005

ECONOMIC IMPACT OF FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS ON THE PULP AND PAPER INDUSTRY,
Crown Zellerbach Corp., Camas, Wash. Dept. of Manufacturing Services.
For primary bibliographic entry see Field 5G.
W75-02007

DECOLORIZATION OF KRAFT MILL EFFLUENTS WITH POLYMERIC ADSORBENTS,
Rohm and Haas Co., Philadelphia, Pa.
S. L. Rock, A. Bruner, and D. C. Kennedy.
Tappi, Vol 57, No 9, p 87-92, Sept. 1974. 5 fig, 6 tab, 5 ref.

Descriptors: *Adsorption, *Bleaching wastes, *Pulp wastes, *Polymers, *Polyelectrolytes, *Chemical precipitation, *Color, Waste treatment, *Waste water treatment, Suspended solids, Costs, Treatment facilities, Fibers(Plant), Chemical oxygen demand, Biochemical oxygen demand, Lime, Ion exchange, Cost-benefit analysis, Capital cost, Operating cost, Economics, Effluents, Pollution abatement, Chlorine, Chlorination.
Identifiers: Amberlite XAD-8(Rohm and Haas), Kraft mills, Bleach plants, Alkaline extraction.

A one-step waste treatment process for kraft pulp bleaching effluents has been developed, based on the use of Amberlite XAD-8, a polymeric adsorbent. The process is said to be more economical than lime treatment or ion exchange. Decolorization trials were performed on a mixture of alkaline extraction effluent (which causes about 66% of the bleach plant effluent's color) and chlorination effluent (which is responsible for about 19% of the total effluent color) from an eastern U.S. kraft mill, as well as on the caustic extract acidified with sulfuric acid. The Amberlite treatment removed 70 to 95% of the color from a bleach plant processing 700 daily tons of pulp. Simultaneously, it removed 33% of the effluent's BOD, 43% of its COD, and 78% of the suspended pulp fibers and other solids. Cost estimates for different levels of color removal are indicated, and compared with the economics of other decoloring processes. The Amberlite system requires an estimated capital investment of nearly one million dollars and an operating expenditure of about 42 cents per ton of bleached pulp. (Sykes-IPC)
W75-02008

CHANGES IN THE COMPOSITION OF CHLORINE BLEACH EFFLUENTS UPON REVERSE OSMOSIS (ZMENA ZLOZENIA CHLORACNYCH BIELIARENSKYCH VOD PO PRECHODE REVERZNEOSMOTICKYMI MEMBRANAMI),
Vyskumny Ustav Papiery a Celulozy, Bratislava (Czechoslovakia).
T. Halmova, L. Balhar, and I. Bencik.
Papir a Celuloza, Vol 29, No 7-8, p V49-53, 1974. 6 fig, 6 tab, 9 ref. English summary.

Descriptors: *Reverse osmosis, *Bleaching wastes, *Membrane separation processes, *Separation techniques, *Pulp wastes, Waste treatment, *Waste water treatment, Organic compounds, Chlorides, Chlorine, Chlorination, Cellulose, Effluents, Castings, Inorganic compounds, Solvents, Temperature, Filtration, Pressure, Hydrodynamics.
Identifiers: *Cellulose acetate.

Reverse osmosis (R.O.) membranes were prepared from aqueous acetone solutions of cellulose acetate in the presence of magnesium perchlorate by evaporation of the acetone followed by warm water treatment to cast the membranes. Manufacturing and process variables were evaluated in laboratory R.O. trials, using the chlorination-stage effluent of a pulp bleach plant. Determinations of chloride ions and COD in the filtrate indicated that the separation selectivity of the membranes were affected mainly by their casting temperature. Membranes cast or set at lower temperatures selectively removed mainly the organic effluent fraction and allowed chloride ions to pass through. Such membranes may find practical uses in the R.O. treatment of bleachery effluents where separation of inorganic components was not essential. Osmotic filtration rates plotted against hydrodynamic pressure indicated that these membranes give rather high throughputs at lower pressures than do conventional R.O. membranes which separate both organic and inorganic fractions. (Trubacek-IPC)
W75-02011

ASPECTS OF THE SELECTION OF PROPER TECHNOLOGY FOR CLEANING OF SULFITE PULP MILL WASTE WATERS (ASPEKTY VOL'BY VHODNYCH TECHNOLOGII CISTENIA ODPADOVYCH VOD ZO SULFITOVYCH CELULOZOK),
Institut fuer Zellstoff und Papier Heidenau (East Germany).
H. Schmidt, and G. Weigt.
Papir a Celuloza, Vol 29, No 7-8, p V59-64, 1974. 8 fig, 5 tab. English summary.

Descriptors: *Waste treatment, *Sulfite liquors, *Pulp wastes, *Waste water treatment, Biological treatment, Chemical precipitation, Color, Suspended solids, Chemical oxygen demand, Biochemical oxygen demand, Sludge, Coagulation, Ion exchange, Water quality control, Recirculated water, Industrial water, Water purification, Phosphates.
Identifiers: Sulfite pulp mills, Wofatit ion-exchange resins.

The quality of effluent streams and the required purity of the receiving water will determine the most appropriate treatment method. Sulfite pulp will effluents differ according to origins in the mill (digester, evaporator, etc.); their characteristics are tabulated. BOD removal is most frequently accomplished by biological treatments. Biodegradation rates can be improved by process optimization. Two-stage bio-treatment is not considered necessary for sulfite effluents. Biological processes usually are inefficient in color and COD removals. Among chemical treatments, coagulants are effective but produce high sludge volumes. Ion-exchange resins, such as Wofatit AD41, are practical for partial treatment of sulfite evaporator condensates which, after treatment, can be recycled for brown stock (unbleached kraft pulp) washing and bleaching. Wofatit EA60 resin achieves substantial color and phosphate removals from pretreated sulfite mill effluents, and can remove up to 50 g of COD/liter. (Trubacek-IPC)
W75-02012

THE BELLMER CONVERGING-BELT PRESS FOR SLUDGE DEWATERING (DIE BELLMER-WINKELPRESSE ZUR SCHLAMMENTWAESSERUNG),
K. Keim.
Der Papiermacher, Vol 23, No 3, p 38-39, 43, March 16, 1974. 5 fig.

Descriptors: *Screens, *Filters, *Sludge treatment, *Dewatering, Sludge, Equipment, *Flocculation, Treatment facilities, Moisture content, *Waste water treatment.
Identifiers: Belt filters, Dewatering presses.

In the converging-belt filter press described and illustrated, manufactured by Maschinenfabrik Gebrueder Bellmer in Niefern, West Germany, Sludge is first mixed with a flocculant and then fed between two vertical converging polyester fabric screen belts which pass around a perforated cylinder before diverging again. The maching is designed to process sludges containing 2-6% solids and can discharge a continuous sludge cake of up to 55% dryness content. (Speckhard-IPC)
W75-02013

BASIC CONSIDERATIONS OF THE CLOSED MILL SYSTEM,
Technische Universitaet, Darmstadt (West Germany). Institut fuer Paperfabrikation.
For primary bibliographic entry see Field 3E.
W75-02015

EFFECT OF CONCENTRATION OF FERRIC SULFATE SOLUTION ON THE EFFECTIVENESS OF WATER COAGULATION (VLIYANIE KONTSENTRATSII RASTVODA SUL'FATA ZHELEZA NA EFFEKTIVNOST' KOAGULIROVANIYA VODY),
V. F. Nakorchevskaya, V. A. Romodanova, and L. A. Kul'skii.
Khimicheskaya Tekhnologiya, No 3, p 10-12, May-June 1974. 4 fig, 2 tab, 9 ref.

Descriptors: *Coagulation, *Waste water treatment, *Water treatment, *Iron compounds, *Sulfates, Sedimentation, Waste water treatment, Color, Hydrolysis, Adsorption, Hydrogen ion concentration, Turbidity, Suspended solids, Dissolved solids, Temperature, Efficiencies.
Identifiers: Ferric sulfate, Aluminum sulfate.

As a coagulant for suspended and dissolved solids in waters and waste waters, ferric sulfate is superior to aluminum sulfate in achieving more rapid sedimentation and better coagulation at low temperatures, and permitting a wider range of optimum water pH. Besides pH, color, and turbidity of treated waters, the coagulation efficiency depends on the concentration of the coagulant solution. This factor was studied experimentally be treating natural and synthetic waters of different color intensities with 35 to 80 mg/liter of ferric sulfate solutions of 0.59% to 17.2% concentrations. Results suggested that more highly concentrated coagulant solutions (5-10%) are more effective, apparently because they are less susceptible to hydrolysis and because the resulting ferric hydroxide has a better adsorption capacity. (Stapinski-IPC)
W75-02016

PHYSICAL-CHEMICAL TREATMENT OF COMBINED MUNICIPAL PULP AND PAPER WASTES,
Environmental Control Technology Corp., Ann Arbor, Mich.
W. B. McCuaig, P. F. Atkins, Jr., and B. L. Lueck.
Tappi, Vol 57, No 9, p 145-148, Sept 1974. 6 fig, 2 tab, 3 ref.

Descriptors: *Pulp wastes, *Municipal wastes, *Waste water treatment, Treatment facilities, *Industrial wastes, *Wisconsin, *Coagulation, Iron compounds, Sedimentation, Filtration, Adsorption, Activated carbon, Recycling, Costs, Capital costs, Operating costs, Economics, Pilot plants, Biochemical oxygen demand, Chemical oxygen demand, Pulp and paper industry.
Identifiers: Deinking mills, Waste paper, Paper machines, White water(Paper machine), Ferric sulfate, *Combined treatment.

A pilot-scale physical-chemical effluent treatment installation in Menasha, Wisconsin, was used to treat combined municipal-industrial waste waters containing about 80% of waste paper deinking and paper machine effluents. The installation operated continuously for two months while treating 6000 gal/day by chemical coagulation (with ferric chloride), sedimentation, high-rate solids filtration, and carbon adsorption. Hourly samples were taken from six locations in the system, and 24-hr composites were analyzed daily. The raw waste water contained an average of 1240 mg/liter of suspended solids and 483 m/liter of BOD. The BOD and COD removals depended on the periodicity of carbon replacement and normally varied between 90% and 99%. A portion of the used carbon was thermally regenerated and recycled. The adsorptive properties of regenerated carbon were comparable to those of the virgin carbon. An estimate based on the pilot-plant results indicated that a 40 mgpd treatment system similar to that in Menasha would require $22 million of capital expenditures. Operating costs would depend on the degree of BOD removal desired. (Sykes-IPC)
W75-02017

NOTE ON DISSOLUTION OF WOOD MATERIAL DURING PRESSURIZED REFINING, AND WATER POLLUTION CONSEQUENCES,
Swedish Forest Products Research Lab., Stockholm.
For primary bibliographic entry see Field 5B.
W75-02018

REMOVAL OF HEAVY METALS FROM WASTE WATER WITH A STARCH XANTHATE-CATIONIC POLYMER COMPLEX,
Agricultural Research Service, Peoria, Ill. Northern Regional Research Lab.
R. E. Wing.
In: Proceedings of the 8th National Conference on Wheat Utilization Research, Denver, Colorado, Oct 10-12, 1973. Agricultural Research Service, Western Regional Research Center (Albany, California, ARS W-19, p 26-31, Sept 1974. 6 fig, 6 tab, 3 ref.

Descriptors: *Mercury, *Heavy metals, Waste treatment, *Waste water treatment, Industrial wastes, Poisons, Carbohydrates, Additives, Pollution abatement, *Polyelectrolytes, *Chelation, *Cations, *Polymers, Effluents, Separation techniques, Coagulation, Chemical precipitation.
Identifiers: *Starch xanthate, Starch derivatives, Polyethylenimine.

Removal of mercury and other heavy metals from industrial effluents was achieved by sequential additions of a starch xanthate and a cationic polyelectrolyte, such as polyethylenimine or poly(vinylbenzyltrimethyl ammonium chloride). A modified process which does not require expensive cationic polymer was recently developed, which utilizes a water-insoluble starch xanthate produced by reacting a highly cross-linked starch with sodium hydroxide and carbon disulfide. In both of these processes, the treated effluent is separable into a cleaned fraction and an insoluble starch xanthatemetal complex which can be reacted with nitric acid to recover insoluble starch, sulfuric acid, and a concentrated heavy metal solution. (Brown-IPC)
W75-02021

THICKENING AND DEWATERING CHARACTERISTICS OF KRAFT MILL SLUDGES FROM A HIGH-PURITY OXYGEN TREATMENT SYSTEM,
Hydroscience, Inc. Westwood, N.J.
G. J. Kehrberger, T. J. Mulligan, W. D. South, and B. Djordjevic.

Tappi, Vol 57, No 9, p 119-122, Sept 1974. 5 fig, 3 ref.

Descriptors: Waste treatment, *Pulp wastes, *Waste water treatment, *Sludge treatment, *Biochemical oxygen demand, *Biological treatment, *Activated sludge, *Oxygenation, *Aeration, Oxygen, Dewatering, Sludge, Filtration, Filters, Turbines, Equipment, Treatment facilities, Pilot plants, Suspended solids, Organic loading, Effluents.
Identifiers: Kraft mills, Clarifiers.

Pilot-plant studies are reported on the evaluation of a biological system using high-purity oxygen for treatment of kraft pulp and paper mill waste waters. The oxygen was fed to the first stage of the system by means of a turbine aerator. Residual oxygen was collected and pumped through another turbine for distribution to the second stage, and this method was continued through the remaining stages of the system. The total system operated at organic loadings of 0.54 to 1.3 lb of BOD removal/day/lb of MLVSS (mixed liquor volatile suspended solids). Consistently good BOD removals were obtained. The biological sludge produced showed excellent settling and thickening (dewaterability) characteristics. Laboratory tests of the primary underflow indicated that the sludge could be thickened in the clarifier to 3%, and that secondary treatment sludge could be thickened to 2.5% concentration. Vacuum filtration studies demonstrated that the total suspended solids level and the primary solids level in the feed have a significant effect on system loading. (Sykes-IPC)
W75-02022

A LABORATORY STUDY OF COLOR REMOVAL FROM PULP AND PAPER WASTE WATERS BY COAGULATION,
Vanderbilt Univ., Nashville, Tenn.
M. G. Olthof, and W. W. Eckenfelder, Jr.
Tappi, Vol 57, No 8, p 55-56, Aug 1974. 4 tab.

Descriptors: *Pulp wastes, Waste treatment, *Color, *Coagulation, Iron compounds, Sulfates, Aluminum, Lime, Cost-benefit analysis, Economics, Operating costs, *Neutralization, *Hydrogen ion concentration, Costs, Bleaching wastes, Pulp and paper industry, *Waste water treatment, Suspended solids.
Identifiers: Kraft mills, Board mills, Newsprint, Groundwood pulp, Ferric sulfate, Aluminum sulfate, Coagulants, Chemical consumption.

Color removal trials were conducted on three pulp and paper mill effluents, using ferric sulfate, alum (aluminum sulfate), and lime as coagulants. Two of the mills used bleached kraft pulp plus groundwood pulp for newsprint. The third mill produced unbleached kraft paperboard. Results of the laboratory studies indicated that ferric sulfate was more economical than lime (presently the most popular coagulant, since the required dosage was only 25-35% of that required for lime treatment). In addition, ferric sulfate (as well as alum) gave a slightly acidic effluent which could be readily neutralized, whereas the high pH of lime-treated effluent required considerable chemical consumption for neutralization. (Sykes-IPC)
W75-02023

DISCUSSIONS ON DISPOSAL OF PAPER MILL WASTES,
Regional Engineering Coll., Tiruchirapalli (India).
K. R. Vaidyanathan, and V. Pachaiyappan.
Chemical Industry Developments, Vol 7, No 4, p 13-17, April 1973. 1 fig, 1 tab, 9 ref.

Descriptors: *Aerated lagoons, *Treatment facilities, *Pollution abatement, *Pulp wastes, *Pulp and paper industry, Economics, Effluents, *Waste water treatment.
Identifiers: India.

The composition and characteristics of effluents from different wood-pulping processes are outlined, and various methods for treating these wastes are discussed. In India, aerated lagoons are preferred, as they require less land and are more economical than other facilities. (Buchanan-IPC)
W75-02024

ADSORPTION OF MERCURY FROM AQUEOUS SOLUTIONS BY POLYETHYLENIMINE-MODIFIED WOOL FIBERS,
Commonwealth Scientific and Industrial Research Organization, Belmont (Australia). Div. of Textile Industry.
G. N. Freeland, R. M. Hoskinson, and R. J. Mayfield.
Environmental Science and Technology, Vol 8, No 10, p 943-944, Oct 1974. 1 tab, 14 ref.

Descriptors: *Adsorption, *Mercury, *Water purification, *Ion exchange, *Separation techniques, Polymers, Aqueous solutions, Metals, Water pollution sources, Poisons, Heavy metals, Fibers(Plant), *Waste water treatment.
Identifiers: Polyethylenimine, Wool, Keratin, Adsorbents.

Polyethylenimine-modified wool (PEI-wool), when used in a packed column or a standing bath, had a substantially greater ability to adsorb Hg from aqueous solutions than unmodified keratin. A capacity of 3.3 milliequivalents/gram was achieved within 30 min using solutions of 1000 ppm Hg. Sorption from liquors passing through a column was rapid and effective at the 1 ppm level. The sorbed Hg was readily desorbed and the PEI-wool used repeatedly. (Witt-IPC)
W75-02025

REMOVAL OF MERCURY FROM AQUEOUS SOLUTIONS BY N-(2-AMINOETHYL)AMINODEOXYCELLULOSE COTTON,
Southern Regional Research Lab., New Orleans, La.
S. L. Snyder, and T. L. Vigo.
Environmental Science and Technology, Vol 8, No 10, p 944-946, Oct 1974. 2 tab, 11 ref.

Descriptors: *Mercury, *Ion exchange, *Water purification, Waste treatment, *Adsorption, *Separation techniques, Ions, Metals, Water pollution sources, *Waste water treatment, Industrial wastes, Cellulose, Aqueous solutions, Poisons, Heavy metals.
Identifiers: N-(2-Aminoethyl)aminodeoxycellulose, Cellulose derivatives, Adsorbents, Mercury compounds, Mercuric chloride.

N-(2-Aminoethyl)aminodeoxycellulose (AEAC) was prepared in yarn form by reaction of ethylenediamine with chlorodeoxycellulose. The adsorption of mercuric ion by AEAC (degree of substitution 0.4) was studied over a wide range of concentrations. In the concentration range 0.5-43 g/liter, the adsorption of mercuric chloride follows the Freundlich relationship, $\log x = 0.21 \log C + 2.7$, where x is the mg of mercuric chloride bound/gram of AEAC and C is the residual concentration in g/liter. At concentrations in the range of 3.1-0.6 ppm, 100 mg of AEAC removed about 90% of the mercury present in 200 ml of solution, in a single equilibration. The results suggest the possilbe use of AEAC as an agent for the collection of mercury in industrial process and waste streams. (Witt-IPC)
W75-02026

PURIFICATION WITH ACTIVATED CARBON: INDUSTRIAL, COMMERCIAL, ENVIRONMENTAL,
J. W. Hassler.
Chemical Publishing Co., New York, NY, 3rd edition 1974. 390 p. ($22.50).

Descriptors: *Activated carbon, Waste treatment, *Adsorption, *Industrial wastes, *Waste water treatment, Water treatment, Water purification, Domestic water, *Municipal wastes, *Domestic wastes, *Separation techniques, Marketing, *Reviews, Color, Odor, Taste, Chemicals.

This monograph, based on a review of the pertinent literature, is organized into 7 sections. The introduction surveys the history and markets of activated carbon and elementary aspects of adsorption from gases and liquids. Applications to industrial and environmental liquid systems are covered in section II which deals with basic aspects and concepts, such as decoloring of effluents, taste and odor control, haze, the joint use of carbon with other separation techniques, and purification of domestic and industrial waters. Other system applications are handled in section III, while section IV discusses the preparation, regeneration, catalytic action, and other physical and chemical characteristics of activated carbon. Biochemical properties are described in section V, and laboratory procedures in section VI. The last section deals with measurement of adsorption and miscellaneous related topics. An index is appended, and literature references are cited after each chapter. (Brown-IPC)
W75-02027

WASTE WATER PURIFICATION MEASURES AT THE BIBERIST PAPER MILL (ABWASSERSANIERUNGSMASSNAHMEN DER PAPIERFABRIK BIBERIST),
Papierfabrik Biberist (Switzerland).
U. Fenchel.
Wochenblatt fuer Papierfabrikation, Vol 102, No 6, p 198, March 31, 1974. 2 fig.

Descriptors: Treatment facilities, *Pulp wastes, Pulp and paper industry, Europe, Waste treatment, *Biological treatment, Suspended solids, *Biochemical oxygen demand, *Waste water treatment, *Sludge treatment, *Dewatering, Sludge disposal, *Landfills, *Activated sludge, Recycling, Solid wastes, Waste water(Pollution), Pollution abatement.
Identifiers: Switzerland, Attisholz process.

An illustrated description is given of a mechanical-biological two-stage effluent treatment installation at a Swiss paper mill which uses the Attisholz process to process 20,000 cu m of daily waste water discharge containing 300 mg/liter of 5-day BOD and 1100 mg/liter of suspended solids. The treatment plant reduces the BOD to 25 mg/liter and the solids content to below 30 mg/liter. The recovered solids are recycled for newsprint production. The spent biological sludge (ca. 15 daily tons) is centrifuged, and the dewatered sludge is transported to a nearby landfill. (Speckhard-IPC)
W75-02029

DISPOSAL OF SLUDGES FROM THE PURIFICATION OF PAPER INDUSTRY WASTE WATERS (BESEITIGUNG VON SCHLAEMMEN AUS DER RESTABWASSERREINIGUNG DER PAPIERINDUSTRIE),
Technische Universitaet, Darmstadt (West Germany). Wasser- und Abwasserforschungsstelle.
H-L. Dalpke.
Wochenblatt fuer Papierfabrikation, Vol 102, No 6, p 209-213, March 31, 1974. 2 fig, 14 ref.

Descriptors: *Sludge treatment, *Sludge disposal, Sludge, *Pulp wastes, *Dewatering, Equipment, *Landfills, *Incineration, Solid wastes, Ultimate disposal, *Waste treatment, Economics, Byproducts, Recycling, Sedimentation, Flotation, Filtration, Filters.
Identifiers: Presses, Filter presses, Converging-belt press, Tower press.

Based on a survey of the pertinent literature, a review is given of sludge treatment and disposal

methods and equipment, with special emphasis on paper industry effluent treatment sludges. Sedimentation, filtration, flotation, and other dewatering techniques are outlined, with special attention to mechanical presses. High-capacity twin-belt dewatering presses which could serve as economical alternatives to conventional devices include the 'tower press' and the 'converging-wire press'. Landfills, sludge incineration, and reuse of recovered solids in byproduct manufacture are also reviewed. (Speckhard-IPC)
W75-02030

PHYSICAL-CHEMICAL TREATMENT OF PAINT INDUSTRY WASTEWATER,
Wayne State Univ., Detroit, Mich.
C-P. Huang, and M. Ghadirian.
Journal Water Pollution Control Federation, Vol 46, No 10, p 2340-2346, October, 1974. 11 fig, 1 tab, 6 ref.

Descriptors: *Waste water treatment, *Industrial wastes, *Paints, *Dissolved solids, Alkylbenzene sulfonates, Chemical oxygen demand, Hydrogen ion concentration, Flocculation, Water pollution control, Waste treatment, Rubber.
Identifiers: *Latex, Physical-chemical treatment.

Studies of wastes from latex paint manufacturing showed that 90% solids removal may be achieved by reducing the pH of the waste water to below 3.5. Dissolved substances are also removed with the solids. The amount of soluble substances, alkylbenzene sulfonate, and COD removed is proportional to the total solids that settle. A slightly lower level of removal may be achieved above pH 10. When adjustment of pH is not feasible or is undesirable, the waste water may be treated by adding polymeric flocculants in concentrations of 1.0 mg/liter or greater at neutral pH. Removal efficiency is lower, however, than at low pH. (Witt-IPC)
W75-02031

REVERSE OSMOSIS OF AQUEOUS SODIUM CHLORIDE AND MALTOSE SOLUTIONS, USING CELLULOSE ACETATE MEMBRANES, (IN JAPANESE),
Tokyo Inst. of Tech. (Japan). Dept. of Textile and Polymeric Materials.
K. Kataoka, S. Aoki, K-I. Furuhata, T. Sakai, and H. Tonami.
Journal of the Society of Fiber Science and Technology Japan (Sen-i-Gakkaishi), Vol 30, No 5/6, p T250-254, May-June 1974. 4 fig, 2 tab, 7 ref. English summary.

Descriptors: *Aqueous solutions, *Reverse osmosis, *Sodium chloride, *Carbohydrates, Water treatment, *Waste water treatment, Pressure, Activation energy, Cellulose, Membranes, Membrane processes, Separation techniques, Diffusion, Permeability, Permselective membranes.
Identifiers: *Maltose, Cellulose acetate, Asymmetric membranes.

Asymmetric reverse osmosis membranes made of cellulose acetate were operated in the forward and reverse directions in solutions of sodium chloride and maltose. The effects of heat treatment and permeation pressure were found to be similar in both directions. The apparent activation energies of permeation indicated that the diffusion mechanism of maltose differs from that of sodium chloride. Also, the reverse-osmosis permeation may follow a mechanism different from that operative in the forward direction. (Brown-IPC)
W75-02032

A PILOT PLANT STUDY OF A ROTATING BIOLOGICAL SURFACE FOR SECONDARY TREATMENT OF UNBLEACHED KRAFT MILL WASTE,
Westvaco Corp., North Charleston, S.C.
J. E. McAliley.
Tappi, Vol 57, No 9, p 106-111, Sept. 1974. 14 fig, 1 tab, 7 ref.

Descriptors: Treatment facilities, *Pulp wastes, Waste treatment, *Biological treatment, *Activated sludge, Sludge treatment, *Filtration, Effluents, *Waste water treatment, Foaming, Retention, Energy, Suspended solids, Moisture content, *Pilot plants.
Identifiers: RBS(Rotating Biological Surface) treatment.

A pilot-plant comparison of the RBS (rotating biological surface) and the activated sludge process was conducted over a five-month study period on the effluents of a southern U.S. kraft pulp mill. The RBS process required only about 40% of the energy demanded by the activated sludge system. In addition, it required a shorter retention time, less operator attention, caused no foaming problems, and produced a sludge of somewhat higher consistency (dryness) but of equal filterability. (Sykes-IPC)
W75-02033

A PILOT-SCALE EVALUATION OF ROTATING BIOLOGICAL SURFACE TREATMENT OF PULP AND PAPER MILL WASTES,
National Council of the Pulp and Paper Industry for Air and Stream Improvement, Inc., Gainesville, Fla.
W. J. Gillespie, D. W. Marshall, and A. M. Springer.
Tappi, Vol 57, No 9, p 112-117, Sept. 1974. 12 fig, 5 tab.

Descriptors: *Biological treatment, *Pulp wastes, Treatment facilities, Hydraulic equipment, *Suspended solids, *Biochemical oxygen demand, Sludge, *Sludge treatment, Dewatering, Sedimentation, Pulp and paper industry, Effluents, *Pilot plants, Sewage treatment, Activated sludge, *Waste water treatment.
Identifiers: RBS(Rotating Biological Surface) treatment.

Trial evaluations of the RBS system were conducted on a wide range of effluents from insulation board, bleached and unbleached kraft, coated and uncoated fine paper, waste paperboard, groundwood, and sulfite mills. Effects of hydraulic loading and rotating speeds on system performance were studied, along with effluent quality (BOD and suspended solids), and resistance of the system to shock loads. The RBS was found to be capable of achieving high-level treatment on all pulp and paper wastes, but needs to be designed for hydraulic load rates considerably lower than those normally specified for domestic sewage. Resistance to shock loadings was excellent, and operation of the system was relatively simple and easy. Secondary sludge generated was comparable in settling and dewatering properties to waste activated sludge. (Sykes-IPC)
W75-02034

CONTROL OF DEPOSIT FORMATION AND RELATED PROBLEMS IN THE BLEACH PLANT AND PULP MILL.
Betz Labs., Inc., Trerose, Pa.
For primary bibliographic entry see Field 3E.
W75-02035

LONG-TERM EXPERIENCE WITH CONTINENTAL CAN'S COLOR REMOVAL SYSTEM,
Continental Can Co., Inc., Hodge, La.
E. L. Spruill.
In: Preprinted Proceedings TAPPI Environmental Conference, New Orleans, Louisiana, April 17-19, 1974, (TAPPI, Atlanta, Ga.), p 19-24, (1974). 4 fig, 1 tab, 4 ref.

Descriptors: Waste treatment, *Pulp wastes, *Waste water treatment, *Lime, *Color, *Organic loading, *Sludge treatment, Incineration, Calcium compounds, Treatment facilities, Operating costs, Capital costs, Costs, Economics, Effluents, Industrial wastes, Pulp and paper industry, Louisiana.
Identifiers: Kraft mills, Lime kilns, Chemical recovery.

Massive lime treatment of kraft mill effluents for more than 2 years has indicated successful removals of color (80%) and total organic carbon (40%) with applied doses of less than 1000 mg of calcium oxide per liter. The resulting sludge, including fibrous debris, has been burned in the mill's lime kiln to recover about 95% of the calcium oxide. Operating costs of the system were 5.5 to 6.5 cents per 1000 gal of effluent. Capital costs for such a treatment installation will vary with the size of the plant and the volume of effluents to be processed. (Sykes-IPC)
W75-02036

NSSC MILL EXPERIENCE WITH WASTE WATER REUSE AND REVERSE OSMOSIS,
Green Bay Packaging Inc., Wis.
W. R. Nelson, G. O. Walraven, and D. C. Morris.
In: Preprinted Proceedings TAPPI Environmental Conference, New Orleans, April 17-19, 1974, (TAPPI, Atlanta, Ga.), p 63-71, (1974). 11 fig, 2 tab, 3 ref.

Descriptors: Waste treatment, *Pulp wastes, *Waste water treatment, *Water reuse, *Recycling, *Recirculated water, *Reverse osmosis, Treatment facilities, *Wisconsin, Pulp and paper industry, Pollution abatement, Water purification, Industrial water, Water pollution control, Discharge(Water), Waste water(Pollution), Surges.
Identifiers: Neutral sulfite semichemical(NSSC) pulp, Board mills, Sulfite mills.

The sodium-base neutral sulfite semichemical pulp and paperboard mill of Green Bay Packaging Inc. in Green Bay, Wisconsin, employs a recycled water system with provisions for spill containment and protection against process upsets. A significant function in this system is exercised by a reverse osmosis (R.O.) unit supplied by Universal Oil Products Co. The R.O. plant is to improve and protect the stability and reliability of the total reuse scheme by removing excess volume and maintaining the surge capacity of the system, apart from improving the mill's pollution abatement program. Preliminary results are reported as encouraging. (Sykes-IPC)
W75-02037

EVALUATION OF FOUR BIOLOGICAL SYSTEMS ON INTEGRATED PAPER MILL EFFLUENT,
Crown Zellerbach Corp., Camas, Wash. Dept. of Manufacturing Services.
H. T. Chen, E. E. Fredrickson, J. F. Cormack, and S. R. Young.
In: Preprinted Proceedings TAPPI Environmental Conference, New Orleans, Louisiana, April 17-19, 1974, (TAPPI, Atlanta, Ga.), p 143-156, (1974). 6 fig, 6 tab, 12 ref.

Descriptors: *Biological treatment, *Pulp wastes, Waste treatment, *Waste water treatment, Effluents, Sludge, *Activated sludge, Oxygen, *Aerated lagoons, *Trickling filters, Filters, *Filtration, Treatment facilities, *Pilot plants, Biochemical oxygen demand, Suspended solids, Color, Hydrogen ion concentration, Dewatering, Sludge treatment.
Identifiers: RBS(Rotating Biological Surface) treatment, Kraft mills, Groundwood mills.

Pilot plants using oxygen-aided activated sludge (OAS), rotating biological surface (RBS), plastic trickling filter (TF), and aerated stabilization basin (ASB) were operated to evaluate their relative ability of treating waste waters from an integrated pulp and paper mill manufacturing bleached kraft

and mechanical (refiner groundwood) pulps. The RBS and OAS units provided 90% BOD removals at moderate loadings. The ASB would have required 10 days or longer retention times to achieve the same results. The TF gave less than expected removals. None of the units attained significant reductions of total suspended solids or color. Effective pH control was essential for reliable treatment in all units. The biological sludges produced showed comparable dewatering characteristics, but all required conditioning prior to vacuum filtration. (Sykes-IPC)
W75-02038

OZONATION OF A KRAFT MILL EFFLUENT,
Glatfelter (P.H.) Co., Spring Grove, Pa.
H. D. Bauman, and L. R. Lutz.
In: Preprinted Proceedings TAPPI Environmental Conference, New Orleans, Louisiana, April 17-19, 1974, (TAPPI, Atlanta, Ga.), p 211-222, (1974). 7 fig, 2 tab.

Descriptors: Waste treatment, *Ozone, *Pulp wastes, *Bleaching wastes, *Waste water treatment, *Biochemical oxygen demand, *Color, Chemical oxygen demand, Suspended solids, Organic loading, Coliforms, Effluents, Disinfection, Water purification, Water treatment.
Identifiers: Kraft mills.

A 5 gal/min pilot plant was operated to study ozone treatment of effluents from an integrated kraft pulp and paper mill which had undergone primary or primary plus secondary treatment. Application of 30-40 ppm of ozone reduced the secondary effluent's color by 60-70%. Much larger amounts achieved little further color removals. Ozonization caused a 100% increase in 5-day BOD, but the treated effluent's dissolved oxygen exceeded 20 ppm. Dosage of 40 ppm ozone did not produce a completely sterilized effluent, but did reduce the coliform count. The extent of color removal depended on the amount of ozone applied, the initial effluent color and COD, and the suspended solids content,but was not affected by the concentration of ozone in the gas stream. (Sykes-IPC)
W75-02040

GLATFELTER SOLVED PROBLEM OF A HOPELESSLY POLLUTED MAIN STREAM.
Paper Trade Journal, Vol 158, No 24, p 32-36, June 17, 1974. 14 fig, 3 illus, 4 tab.

Descriptors: Waste treatment, *Waste water treatment, *Water supply, *Pulp wastes, *Bleaching wastes, Pulp and paper industry, *Pennsylvania, Freshwater, *Industrial water, Water conservation, Water consumption(Except consumptive use), Streams, Costs, Capital costs, Reservoirs, Aquatic life, Activated sludge, Sewage treatment, Industrial wastes, Municipal wastes, Color, Suspended solids, Sewers, Water reuse, Regulation, Recirculated water.
Identifiers: Codorus Creek(Pennsylvania).

When the water supply and waste assimilative capacity of a small creek (Codorus Creek) near Spring Grove, Pa., became inadequate to meet the needs of the township and its integrated bleached kraft pulp and fine paper mill, the P.H. Glatfelter Co. started a comprehensive improvement program to augment water supply, reduce freshwater usage and solids losses, and raise the level of waste treatment. The program included expansion of the mill's primary and secondary waste treatment plant, upgrading of its activated sludge treatment process, construction of a 16-billion-gallon reservoir financed jointly with the Pennsylvania Commonwealth), and various in-plant measures for reduction of effluent color residuals and recovery of fines (fine fibers) and paper filler materials. Savings in process water consumption were achieved by changing the pulp bleaching sequence, installing sewer solids removal equipment, restructuring sewers for retention of high-solids and high-color flows, and reusing the paper machine white water on pulp-washing showers. In 1973, the company started to process the town's sewage plant effluent through its own treatment plant to upgrade it to the tertiary treatment levels required by government regulations. Stream conditions in the creek have improved and show thriving fish, insect, and plant life. Water supplies for the mill and the township now seem adequate to fill needs to the year 2010. (Witt-IPC)
W75-02042

CONNECTION TO PUBLIC SEWAGE WORKS, PARTIAL PURIFICATION OR TOTAL IN-PLANT PURIFICATION, (ANSCHLUSS AN DIE OEFFENTLICHE ARA (ABWASSERREINIGUNGSANSTALT), TEIL-REINIGUNG ODER EIGENE VOLL-REINIGUNG),
H. Furst.
Wochenblatt fuer Papierfabrikation, Vol 102, No 6, p 208-209, March 31, 1974. 1 fig.

Descriptors: Waste treatment, *Pulp wastes, Treatment facilities, *Sewage treatment, *Waste water treatment, *Costs, Economics, Cost-benefit analysis, Pulp and paper industry, Effluents, Water pollution control, Pollution abatement, Pipelines.
Identifiers: *Paper mills, *Board mills, Savealls, Paper machines.

Two illustrative case histories are cited to discuss the pros and cons of piping paperboard mill effluents to a public sewer line as opposed to their partial or total in-plant treatment. Participation in public sewage works may sometimes be economically advantageous, but requires preliminary mechanical clarification (solids removal) of industrial waste waters. Paper machine savealls must not be regarded as ultimate clarifiers. (Speckhard-IPC)
W75-02044

POLLUTION, PAPER INDUSTRY, AND RECYCLING--A PERSPECTIVE FOR THIS DECADE (LA CONTAMINACION, LA INDUSTRIA DEL PAPEL Y EL RECICLAJE, UNA PERSPECTIVA PARA ESTA DECADA),
J. R. Nelson.
ATCP (Asociacion Mexicana de Tecnicos de las Industrias del Papel), Vol 14, No 3, p 187-196, May/June 1974. 1 fig, 6 tab, 14 ref. English summary.

Descriptors: Water pollution, Pulp and paper industry, *Pulp wastes, Waste water(Pollution), *Pollution abatement, *Recycling, Legislation, Regulation, *Water reuse, *Water conservation, Waste treatment, *Waste water treatment, Recirculated water, Sociology, Economics, Costs, Governments, International commissions, Marketing, Treatment facilities.

Pollution control problems facing the paper industry will require changes in technology, marketing, and socio-economic emphasis. These trends are discussed in some detail, including the functions of government regulations, international cooperation, and the recycling of water and raw materials. (Speckhard-IPC)
W75-02045

SOLVENT EXTRACTION OF METALS FROM AMMONIACAL SOLUTIONS,
Power-Gas Ltd., Stockton-on-Tees (England).
J. B. Schuffham, and G. A. Rowden.
Journal of the Society of Mining Engineers, Vol 25, No 12, p 33-34, December, 1973. 1 photo.

Descriptors: *Ammonia, *Leaching, *Mining engineering, Industrial wastes, *Solvent extractions, Chelation, Industrial water, *Metals, *Waste water treatment.

The major advantage of ammoniacal leaching systems over conventional sulfuric acid processes is their ability to reject iron and many acid consuming gangue materials. Although the existence of the major non-ferrous metals as cationic species in ammoniacal solution would suggest the use of simple cationic extractants, their inherent acidity in strongly ammoniacal media results in a large increase in their solubility in the aqueous phase and reagent losses can become prohibitive. The major reagents applied to ammoniacal systems are the copper-specific chelating reagents. The change of environment from acidic to ammoniacal results in changes in the basic design parameters of the chelating reagents, the most important of which is selectivity. To overcome the difficulties associated with the transfer of ammonia with the reagent, it is usually necessary to operate a wash section intermidiate between the extraction and stripping sections. Apart from this necessity and excluding other design features which are necessary to achieve separation of complex feed solutions, the basic design of the extraction and stripping sections is similar to the design for acidic systems with fewer stages required in the extraction section for ammoniacal systems. (Pulliam-Vanderbilt)
W75-02077

MULTIPLE EFFECT EVAPORATOR SYSTEM,
Aerojet-General Corp., El Monte, Calif. (assignee)
For primary bibliographic entry see Field 3A.
W75-02140

APPARATUS FOR MONITORING WATER PURIFICATION SYSTEM,
For primary bibliographic entry see Field 3A.
W75-02141

PROCESS FOR SEWAGE TREATMENT AND WASTEWATER RECLAMATION,
G. Shelef.
U. S. Patent No. 3,839,198, 10 p, 11 fig, 2 tab, 11 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, p 241, October 1, 1974.

Descriptors: *Patents, *Algae, *Photosynthesis, *Sewage treatment, *Aeration, *Waste water treatment, *Water pollution control, *Pollution abatement, *Water quality control, Oxygen, Photosynthetic oxygen, Activated sludge, Aerated lagoons, Equipment.
Identifiers: Day-time cycle, Night-time cycle, Sunlight.

A process is described for treating sewage by using algal photosynthesis for removing contaminants from sewage. The sewage is treated in a channelled algae pond while the sewage meanders through the channels in the pond. The process includes integreated day-time and night-time cycles enabling continuous operation over a 24 hour period. An essential step in the process involves varying the flow rate between the day-time and night-time cycles with a cage aerator. The flow rate during the day-time cycle is controlled by the cage aerator so as to increase the amount of algae that is exposed to light and bring about nutrient exchange between the bottom and surface of the sewage in the channels without stirring up the sludge in the channels. The rotational speed of the cage aerator is increased during the night-time cycle so as to agitate the sewage to stir up the sludge and beat air into the sewage to increase its oxygen content. Thus the process includes mechanically applying oxygen to the sewage and stirring up the sludge during the night-time cycle with the same apparatus used to increase the exposure of sewage to light during the day-time cycle. (Sinha-OEIS)
W75-02144

METHOD OF SOFTENING WATER TO PROVIDE EASILY DRAINED AND EASILY FILTERED PRECIPITATES,
Permutit Co., Paramus, N. J. (assignee).
For primary bibliographic entry see Field 5F.
W75-02145

PROCESS FOR REMOVING POLLUTANTS FROM LIQUIDS,
Liquid Waste Conversion Corp., Churchville, Pa. (assignee).
R. M. Welch.
U. S. Patent No 3,839,206, 3 p, 3 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, 243, October 1, 1974.

Descriptors: *Patents, *Filtration, *Waste water treatment, Water pollution control, Water quality control, Pollution abatement, *Separation techniques, *Reverse osmosis, *Flocculation, Polyelectrolytes, Equipment.

Sewage or industrial waste liquid is pre-treated to remove larger solids by flocculation. As the floc is formed by agitation and flocculation agents in a chamber the larger particles are entrapped by or adhere to the floc. The floc is filtered out by passing the stream through a filter chamber after which the effluent is passed into a reverse osmosis chamber where the dissolved microscopic particles are removed. (Sinha-OEIS)
W75-02146

PROBE FLOATING DEVICE,
Robertshaw Controls Co,. Richmond, Va. (assignee)
T. F. Scott, and W. E. Poindexter.
U. S. Patent No, 3,839,902, 4 p, 4 fig, 2 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 455, October 8, 1974.

Descriptors: *Patents, *Monitoring, Instruments, Water pollution, *Waste water treatment, *Water quality control, *Pollution abatement, Measurement, Sewage treatment, Sensors.
Identifiers: Probes, Floating instruments.

The probe floating device of this invention is characterized by a buoyant float having a probe projecting veritcally through it and terminating on its lower extremity in a sensor. The float is weighted sufficiently to maintain the sensor submerged as the float is propelled from the tops of waves. An anti-fouling shield fairs in with the sensor and is formed with a window for communication of liquid to the sensor. Thus, the sensor will be maintained continuously submerged irrespective of wave action, and the sensor will be maintained clean for accurate sensing. (Sinha-OEIS)
W75-02149

UNDERDRAIN STRUCTURE FOR WASTE EFFLUENT FILTER AND METHOD OF USING SAME,
Hydro-Clear Corp., Avon Lake, Ohio. (Assignee).
D. S. Ross.
US Patent No 3,840,117, 8 p, 12 fig, 6 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 526, October 8, 1974.

Descriptors: *Patents, *Filteration, *Filters, *Waste water treatment, Effluents, Water pollution treatment, *Sewage treatment, Water pollution control, Water quality control, Suspended solids, Separation techniques, Air circulation.
Identifiers: Filter beds.

The invention pertains to the art of filtering solids from a waste liquid effluent, and more particularly to an underdrain structure for a waste effluent filter and the method of using it. The invention relates to an improvement in the underdrain structure of the filter which can be used in accordance with a filter, where air is periodically compressed within the underdrain cavity and forced upward through the media to clean the upper interstices of the media bed between backwashing cycles. One advantage is the even distribution of upward moving air over the total area of the sand bed to periodically remove plugged or packed areas of the bed. The underdrain eliminates any possibility of an eruption of the media through uneven distribution of air or backwash liquid. (Sinha-OEIS)
W75-02151

APPARATUS FOR SEPARATING PARTICLES FROM LIQUID,
Barnes Drill Co., Rockford, Ill. (Assignee).
D. K. Greenberg.
US Patent No 3,840,120, 4 p, 5 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 527, October 8, 1974.

Descriptors: *Patents, *Separation techniques, *Filtration, *Cooling water, *Industrial water, *Water treatment, Water pollution, *Waste water treatment.

The primary aim of the invention is to provide new and improved apparatus which more effectively removes large chips and other large particles from dirty liquid before the latter is sucked into the pump and delivered to the separator thereby avoiding excessive wearing of the pump and avoiding overloading of the separator. This is achieved through the novel provision of a tubular screen which is submerged within the tank and telescoped over the suction line of the pump to filter chips and the like from the dirty liquid before it passes into the suction line and flows into the pump. To continuously remove the filtered out chips from the screen so as to avoid clogging of the screen, the screen is power-rotated past a scraper for brushing the chips off of the screen. (Sinha-OEIS)
W75-02152

VACUUM AERATION OF LIQUID WASTE EFFLUENT,
Clark and Vicario Corp., North Tarrytown, N.Y. (Assignee).
J. A. Smith, R. G. Kaiser, and B. S. Moffatt.
US Patent No 3,840,216, 7 p, 7 fig, 14 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 559, October 8, 1974.

Descriptors: *Patents, *Waste water treatment, Effluents, *Aeration, *Oxidation, Water pollution treatment, *Water quality control.
Identifiers: Entrained air, Vacuum lift, Vacuum chamber.

The invention is concerned with means for providing continuous circulation of liquid effluent and air by means of a vacuum lift in which oxygen transfer to the liquid effluent is achieved by contact it with atmospheric air continuously in a number of passes. Liquid effluent is continuously removed from the surface region of an aeration basin or lagoon and drawn by vacuum into a chamber, the top of which is located a distance above the level of the effluent in the basin. As the effluent is suction lifted in a flow course into the chamber by vacuum, atmospheric air is concurrently admitted to the flow course through orifices located above the level of the liquid surface of the pond, the pressure in the flow course being less than atmospheric pressure since it is under the influence of the vacuum in the chamber. Such air is admitted in the form of small bubbles which contact the effluent as it is moving upward into the vacuum chamber. (Sinha-OEIS)
W75-02154

WATER PURIFICATION SYSTEM,
Overton Engineering, Billings, Mont. (Assignee).
C. E. Overton.
US Patent No 3,814,482, 7 p, 5 fig, 4 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 980, October 15, 1974.

Descriptors: *Patents, *Water purification, *Waste water treatment, *Colloids, Water pollution, *Flocculation, *Coagulation, Water quality control, Pollution abatement, Brackish water, Conductivity, Equipment, Electrical equipment, Monitoring.
Identifiers: Colloidal particles.

A high capacity, flow-through water purification system is described. The system includes one or more chamber units which may be used individually, or arranged in parallel, depending on the volume of water to be purified. The chamber houses first, second and third serially arranged modules. Each module comprises oppositely charged, spaced plates for activating colloidal impurities dispersed in water for subsequent coagulation and removal. Sensors are provided at the chamber inlet and at the chamber outlet for measuring, respectively, conductivity and resistivity. A closed loop proportionate control system is provided for monitoring conductivity and resistivity and for selectively opening and closing inlet and outlet valves to retain a predetermined ratio for a given power input to the ionizing plates. The power system is capable of applying typically up to about 200 volts and from about 2 to about 6 amps direct current to the plates spaced about one inch apart from an input power supply of 110 or 220 volts alternating current. A typical chamber may have overall dimensions of four feet in height and twelve inches in diameter with a four or six inch orifice although larger or smaller units may be constructed. This chamber unit has been found to be capable or purifying a flow rate of at least 1,000 gallons per minute. (Sinha-OEIS)
W75-02156

DUAL AERATION AND FILTRATION SYSTEM WITH RECYCLING,
A. L. McGee.
US Patent No 3,841,997, 3 p, 7 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 1141, October 15, 1974.

Descriptors: *Patents, *Waste water treatment, *Pollution abatement, *Water quality control, Water pollution control, Filtration, Aeration, Equipment, *Recycling.
Identifiers: Diffusers.

In order to provide a method and apparatus for alternately aerating and filtering a fluid such as sewage and industrial wastes and to transport the fluid from one treating compartment to another during the filtering operation diffusers are arranged on a common conduit forming a manifold. This permits alternate aeration and filtration of the fluid held in an enclosure and permits the transport of the fluid from one compartment of the enclosure to another during filtration. A blower is connected to the conduit to intermittently feed aerating fluid under pressure into the conduit. Treated fluid is discharged from the last of several chambers. (Sinha-OEIS)
W75-02158

AEROBIC WASTEWATER TREATMENT PROCESS WITH PARTIAL REUSE AND INFREQUENT DOSING TO SOIL,
Environment/One Corp., Latham, N.Y. (Assignee).
R. P. Farrell, Jr.
US Patent No 3,841,998, 5 p, 2 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 1141, October 15, 1974.

Descriptors: *Patents, *Waste water disposal, Effluents, *Plumbing, *Water pollution treatment, Waste disposal, Domestic wastes, Soil disposal fields, Separation techniques, Water reuse.
Identifiers: Drain fields.

A waste disposal system is disclosed which is particularly for dwellings having limited drain fields or drain field soils having limited capacity. The ef-

fluent is removed from an aerobic treatment and settling tank for ultimate return (at least in part) as flushing fluid for toilets, etc. The sludge is removed from the treatment and settling tank for further treatment and settling so that liquid may be removed from the sludge for return ultimately to the treatment and settling tank. The effluent used for flushing purposes is run into a storage tank and may be chemically treated by a treatment solution eductor and stored in the surge tank supplying the toilets until it is used. Waste water from toilets and other sources is deposited in a small holding tank until a predetermined level has been reached, at which time a grinder-pump will remove the waste from the holding tank and discharge it into the aerobic treatment and settling tank. The liquid removed from the sludge is returned to this holding tank. Various pressure and level sensing controls are used in conjunction with a coordinating and timing control unit to control the sequence of operations for efficiency. Excess effluent is discharged to a drain field in infrequent slug doses in a known manner to enhance performance of any drain field of a given capacity. (Sinha-OEIS)
W75-02159

PROCESS FOR REMOVING PROTEINS AND DECOMPOSITION PRODUCTS THEREOF FROM WASTE WATER,
Apothekernes Laboratorium for Special-praeparato A/S, Oslo (Norway). (Assignee).
P. N. Asker.
US Patent No 3,842,003, 2 p, 2 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 1143, October 15, 1974.

Descriptors: *Patents, *Waste water treatment, *Pollution abatement, *Water quality control, Chemical reactions, Proteins, Amino acids, Biochemical oxygen demand, Chemical precipitation.
Identifiers: Saccharose sulphate, Lactose sulphate, Amylum sulphate.

A process is claimed for removing proteins and any decomposition products especially polypeptides and amino acids, from waste water containing such substances by precipitating the proteins under acidic conditions with an organic sulphuric acid derivative as a precipitant whereby any emulsion of fat and/or oil present in the waste water to be purified is broken down. After the precipitated product is removed it can be further processed, especially into cattle feed, the improvement comprising precipitating the proteins and decomposition products from the waste water with a precipitating agent comprising at least one esterification product of a sugar with sulphuric acid. The esterification product will have a molar weight of at least 200. The esterification product is selected from the group consisting of sacchorose sulphate, lactose sulphate, and amylum sulphate. (Sinha-OEIS)
W75-02161

WATER PURIFICATION MEMBRANES AND METHOD OF PREPARATION.
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
In: Significant NASA Inventions Available for Licensing in Foreign Countries, p 40, 1974. NASA Case No ARC-10643, Corresponding US Patent--Application Pending.

Descriptors: *Patents, *Water purification, *Reverse osmosis, *Membranes, Desalination, Waste water treatment.
Identifiers: Space missions, Allyl amine.

Reverse osmosis membrane technology has grown dramatically in recent years for the production of fresh water and is particularly important in the purification and reuse of water in space missions. The present invention contemplates the fabrication of membranes of allyl amine as thin films in the presence of a plasma discharge. The membranes are superior in that they do not have to be stored in pure H20, demonstrate salt rejection rates of 95% or more, do not compress under use, are formed without pinholes, and in any desired configuration, and, possess high adhesion on a variety of substrates. (Sinha-OEIS)
W75-02162

AN INSTRUMENT FOR THE MEASUREMENT OF FIBRE IN EFFLUENT,
Australian Paper Manufacturers Ltd., Melbourne (Australia).
For primary bibliographic entry see Field 5A.
W75-02166

EFFLUENT CONTROL AT TASMAN,
Tasman Pulp and Paper Co., Kawerau (New Zealand).
W. J. Mitchell.
APPITA (Journal of the Technical Association of the Australian and New Zealand Pulp and Paper Industry), Vol 28, No 3, p 171-174, November 1974.

Descriptors: *Waste water treatment, *Aeration, *Pulp wastes, *Water quality standards, Industrial wastes, Filtration, Aerated lagoons, Oxygenation, Biochemical oxygen demand, Pulp and paper industry, Water quality, Water pollution control, Performance, Effluents.
Identifiers: *New Zealand(Tarawera River).

Expansion of Tasman Pulp and Paper Company's newsprint and kraft mill in Kawerau, New Zealand, has required the establishment of an effluent treatment plant in order to maintain water quality standards in the Tarawera River, which receives the mill effluent. The design and operation of the plant are described. Suspended solids are removed in an 84 m clarifier, and the clarified effluent flows to a system of aeration basins, 55 ha in area. Nine 56 kW aerators have been installed to handle the additional loading from the expansion. After an initial settling-down period, the ponds together with three operating aerators have been able to reduce the Biological Oxygen Demand of the effluent sufficiently to maintain dissolved oxygen in the stream at required levels despite very low flows. Standards required for Class D river water by the New Zealand Resources Council are given in an appendix. (CSIRO)
W75-02176

RECENT EXPANSION OF PERTH'S SEWERAGE SYSTEM,
Perth Metropolitan Water Supply, Sewerage and Drainage Board, Perth (Australia). Sewerage and Drainage Branch.
B. S. Sanders.
Civil Engineering Transactions, The Institution of Engineers Australia, Vol CE16, No 2, p 126-129, 1974. 4 fig.

Descriptors: *Cities, *Treatment facilities, *Sewerage, Municipal wastes, Financing, Utilities, Sewage treatment, Sewage disposal, Waste water disposal, Aeration, *Australia, Planning, Pipelines, *Waste water treatment.
Identifiers: Perth(W.A.).

Since 1962, when the sewerage system of Perth, Western Australia, was based on three schemes originating in the early 1900's, expansion of the system has been in two phases: a period when it was notably limited by lack of available funds, and, since 1967, a rapid expansion period with increased funds from government and land developers. The schemes now under way are described and some of the engineering problems involved are discussed. The dispersion of the new developments and their remoteness from the existing systems have required that a series of waste water treatment plants be constructed. Considerations in the design of these plants are outlined, with particular reference to the way in which the extended aeration process has been used to enable rapid development to proceed. (CSIRO)
W75-02177

RECOVERY OF METALLIC IRON FROM FLOTATION TAILINGS BY PNEUMATOLYTIC TRANSPORT-I. REDUCTION BY CARBON MONOXIDE IN FLUIDIZED BED,
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Chemical Engineering.
C. S. Kim, C. S. Rhee, K. Li, and R. R. Rothfus.
Environmental Science and Technology, Vol 7, No 8, p 725-730, August, 1973. 3 tab, 7 fig, 21 ref.

Descriptors: *Iron, Solid wastes, Mineral industry, *Pollution abatement, *Flotation, Waste dumps, Reduction(Chemical), Recycling, Temperature, *Mine wastes, *Waste water treatment, Water pollution control.
Identifiers: *Recovery(Mine wastes).

Pneumatolytic transport is a promising process for conserving natural resources by recovering valuable metallic iron as a product from iron ore flotation tailings presently disposed of as a solid waste. As the first step this finely divided material was reduced by carbon monoxide in a fluidized bed. The particles were not observed to react topochemically. The reduction data at pressures up to 4.4 atm and temperatures from 593-704 C were interpreted by means of a simple two-step model which postulates that the overall rate of reaction is controlled by both chemical reaction of the homogeneous type and mass transfer between the gas and solid phases with a decreasing effective transfer area due to sticking and defluidization. During reduction, carbon deposition occurred at an approximately constant rate after an initial delay. The total carbon and combined carbon were found to increase approximately linearly with the overall reduction at a given temperature. It is believed that the combined carbon, mainly cementite, is formed by the reaction between metallic iron and carbon monoxide and that the reaction does not play a direct role in reducing oxides. (See also W75-02198) (Jernigan-Vanderbilt)
W75-02197

RECOVERY OF METALLIC IRON FROM FLOTATION TAILINGS BY PNEUMATOLYTIC TRANSPORT-II. FORMATION OF IRON PENTACARBONYL FROM PARTIALLY REDUCED IRON OXIDE IN FIXED BED,
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Chemical Engineering.
C. S. Rhee, C. S. Kim, K. Li, and R. R. Rothfus.
Environmental Science and Technology, Vol 7, No 8, p 730-735, August, 1973. 6 fig, 1 tab, 14 ref.

Descriptors: *Iron, *Pollution abatement, *Flotation, Testing procedures, Reduction(Chemical), Temperature, Recycling, *Mine wastes, *Waste water treatment, Water pollution control.
Identifiers: *Recovery(Mine wastes).

A conceived process for recovery of valuable metallic iron from waste iron ore flotation tailings by pneumatolytic transport involves reduction followed by carbonyl formation. In this work, the formation of iron pentacarbonyl from partially reduced flotation tailings in a fixed bed was studied experimentally at temperatures from 93-177C pressures from 7.8-21 atm, and gas flows from 0.14-0.52 cm/sec. The surface reaction was found to control the overall reaction rate which varies approximately as the second power of carbon monoxide pressure. A deactivation term was introduced to account for the increasing difficulty of interaction of carbon monoxide molecules and iron atoms as reaction proceeded. A model based on surface reaction and deactivation adequately describes the kinetics of carbonyl formation. The existence of an optimum temperature at 120C is believed to be associated with the mobility of adsorbed carbon monoxide at low temperature and

low pressure produces more reactive iron than reduction at higher temperatures and pressures. (See also W75-02197) (Jernigan-Vanderbilt)
W75-02198

5E. Ultimate Disposal Of Wastes

MIXING OF MERGING BUOYANT JETS FROM A MANIFOLD IN STAGNANT RECEIVING WATER OF UNIFORM DENSITY,
For primary bibliographic entry see Field 5B.
W75-01690

PROPOSED REGULATIONS FOR THE DISPOSAL OF WASTEWATER IN SUBDIVISION.
Missouri Clean Water Commission, Jefferson City.
For primary bibliographic entry see Field 5G.
W75-01701

OCEAN WASTE DISPOSAL: A VIOLATION OF THE PUBLIC TRUST DOCTRINE,
Duquesne Univ., Pittsburgh, Pa. School of Law.
For primary bibliographic entry see Field 5B.
W75-01798

PROCESS AND APPARATUS FOR TREATING WASTES BY A COMBINED ACTIVATED SLUDGE AND BIOLOGICAL FILTER BED,
For primary bibliographic entry see Field 5D.
W75-01892

END-OF-PIPE TREATMENT AND DISPOSAL DOMINATE CONFERENCE.
For primary bibliographic entry see Field 5D.
W75-01897

LAND DISPOSAL...WHAT'S THE REALISTIC VIEW,
Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.
For primary bibliographic entry see Field 5D.
W75-01898

SEWAGE SLUDGE DISPOSAL IN A SANITARY LANDFILL, VOL I: SUMMARY AND CONCLUSION; VOL II: DESCRIPTION OF STUDY AND TECHNICAL DATA.
Stone (Ralph) and Co., Inc., Oceanside, Calif.
For primary bibliographic entry see Field 5B.
W75-01925

DISPOSAL OF SLUDGES FROM THE PURIFICATION OF PAPER INDUSTRY WASTE WATERS (BESEITIGUNG VON SCHLAEMMEN AUS DER RESTABWASSERREINIGUNG DER PAPIERINDUSTRIE),
Technische Universitaet, Darmstadt (West Germany). Wasser- und Abwasserforschungsstelle.
For primary bibliographic entry see Field 5D.
W75-02030

AEROBIC WASTEWATER TREATMENT PROCESS WITH PARTIAL REUSE AND INFREQUENT DOSING TO SOIL,
Environment/One Corp., Latham, N.Y. (Assignee).
For primary bibliographic entry see Field 5D.
W75-02159

DISTRIBUTION OF OCEANIC WATER TYPES OFF SOUTH-EASTERN TASMANIA (AUSTRALIA), 1973,
Commonwealth Scientific and Industrial Research Organization, Cronulla (Australia). Div. of Fisheries and Oceanography.
For primary bibliographic entry see Field 5B.
W75-02173

5F. Water Treatment and Quality Alteration

EFFECTS AND ESTABLISHMENT OF CRITERIA,
Illinois State Water Survey, Urbana.
T. E. Larson.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Columbus, Ohio, National Environmental Research Center, Cincinnati, Ohio, p 63-66, February, 1973.

Descriptors: *Water quality control, *Public health, *Water quality standards, *Water purification, Surface waters, Ground waters, Conferences.

Criteria for water quality control and management established by a panel from the Illinois State Water Survey are discussed. The criteria were established in an attempt to quantify water quality in terms of its physical, chemical, biological and aesthetic values. Modern water management techniques and a wide variety of available water treatment processes make possible the use of raw water of almost any quality to produce an acceptable public water supply. The panel defined the following treatment given to raw surface water prior to human consumption: (1) coagulation (less than about 50 milligrams per liter alum, ferric sulfate, or copperas with alkali or acid addition as necessary, but without coagulant aids or activated carbon); (2) sedimentation (six hours or less); (3) rapid sand filtration (three gallons per square foot per minute or more); (4) disinfection with chlorine (without consideration to concentration or form of chlorine residual). Following the recommendations in the report for raw water quality for public supplies assures that the water will be potable both when using surface water, including the defined treatment processes and for ground water, with no treatment whatsoever. For water zoned for public supply but not meeting the recommendations in all respects, the recommendations can be considered a minimum target toward which efforts at upgrading the quality should be directed. (See also W74-09206) (Jernigan-Vanderbilt)
W75-01683

EXPANSION SPARKS NEW DESIGN,
Malcolm Pirnie, Inc., White Plains, N.Y.
G. P. Westerhoff.
Water and Wastes Engineering, Vol 11, No 7, p 38-42, July, 1974. 7 fig, 5 tab.

Descriptors: *Performance, *Operations, *Treatment facilities, Evaluation, Testing, *New York, *Water treatment, Turbidity, Filters, Head loss, *Design criteria, Waste water treatment.
Identifiers: Aluminum ion concentration, Total microscopic count.

The operation and tests necessary in designing the Sturgeon Point Water Treatment Plant in Erie County, New York are described. The data obtained from the six-month study program were analyzed and evaluated to determine the performance of the proposed basin/filter system compared to the control system. The performance evaluation of the two systems was based on removals of turbidity and total microscopic count and on the increase or decrease in aluminum ion concentration in settled and filtered water through each system. Investigative results and subsequent conclusions are presented. (Sandoski-FIRL)
W75-01743

FERRIC CHLORIDE INCREASES WATER PLANT EFFICIENCY,
Philadelphia Water Dept., Pa. Torresdale Plant.
A. F. Hess, and E. J. Schervin.
Public Works, Vol 105, No 7, p 77-78, July, 1974.

Descriptors: *Treatment facilities, *Chlorides, *Water treatment, Equipment, Hydrogen ion concentration, Corrosion control, Operations, Flocculations, Sedimentation, Filtration, Automation.
Identifiers: *Ferric chloride, *Philadelphia(Penn), Prechlorination, Presedimentation, Post-chemical treatment, Lime treatment.

The Philadelphia Water Department has reduced costs and increased efficiency towards planned automation of water treatment by substituting ferric chloride for alum. Corrosion of water treatment equipment has been reduced, the ability to control the pH in the plant effluent has been improved, and the entire operation simplified by converting to the ferric chloride system at one plant. The basic ferric chloride treatment system includes prechlorination and presedimentation, ferric chloride and lime treatment, flocculation, sedimentation, filtration, and post-chemical treatment. 217 million gallons of raw water are processed per day at the Torresdale plant and an average of 80 pounds of ferric chloride are used for every million gallons. (Sandoski-FIRL)
W75-01752

CORNWALL'S NEW PVC TRUNK MAIN,
Chemidus Wavin Ltd., Durham (England).
J. M. Pawson.
Water Services, Vol 78, No 938, p 124-125, April, 1974.

Descriptors: *Water distribution, Water resources development, Water storage, Water supply, Costs, *Water treatment, *Conduits, *Plastic pipes, Reservoir operation, Water demand.
Identifiers: *Polyvinyl chloride, Water mains, Great Britain(Cornwall).

A large plastic 24 inch water main is described as well as local drinking water treatment, reservoir operation, costs and capabilities of the new water main. Demand for additional water due to an increase in residential population, immigration, and seasonal tourism has risen in the town of Cornwall, as it has in much of England. (Shaffer-FIRL)
W75-01769

REPORT TO THE CONGRESS--IMPROVED FEDERAL AND STATE PROGRAMS NEEDED TO INSURE THE PURITY AND SAFETY OF DRINKING WATER IN THE UNITED STATES, (ENVIRONMENTAL PROTECTION AGENCY).
Comptroller General of the United States, Washington, D.C.
November 15, 1973. Report B-166506, 84 p, 12 append.

Descriptors: *Potable water, *Water quality control, *Legislation, *Water quality, *Domestic water, *Water purification, Bacteria, Federal government, Administrative agencies, Legal aspects, Governments, Regulation, Federal jurisdiction, Water treatment, Water quality standards.
Identifiers: Safe Drinking Water Act of 1973.

Improved federal and state legislation is needed to insure the purity and safety of drinking water. Federal authority to regulate drinking water is restricted to the drinking water used on interstate carriers and to foreign and domestic bottled drinking water sold interstate. Generally the water is safe, but some studies show that potentially dangerous water was being delivered to some consumers by small systems. The report introduces five bills which would authorize the establishment of federal drinking water standards applicable to public water supplies and would define the federal and state roles with respect to drinking water. (Whisler-Florida)
W75-01779

REMOVAL OF PHENOLS FROM POLLUTED WATERS,
Rutgers-The State Univ., New Brunswick, N.J.

For primary bibliographic entry see Field 5D.
W75-01857

EVALUATION OF THE KENTUCKY WATER SUPPLY PROGRAM. DRINKING WATER.
Environmental Protection Agency, Atlanta, Ga. Bureau of Water Hygiene.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-228 609, $7.50 in paper copy, $2.25 in microfiche. May 1972, 228 p, 3 tab, 11 ref.

Descriptors: *Public health, *Water supply, *Potable water, *Water quality standards, Engineering, Bacteria, Sampling, Regulations, Systems analysis, Water resources management, Manpower, *Kentucky, Water treatment.
Identifiers: Surveillance, Operator training.

The Kentucky Water Supply Program was investigated and found not to be providing the health evaluation and engineering services necessary to meet its responsibilities to protect the health of Kentucky's citizens. Areas studied included water quality, facilities, and surveillance. It was recommended that the water supply program be given more funds; new and competent personnel, including a bacteriologist and a chemist; and that regulations be revised. New standards should include establishing a minimum sampling frequency, clarifying the quality standards for drinking water, providing for orderly development of new supplies, and requiring that water system plans be prepared by professional engineers. For the public health, improvements are needed in the areas of legal statutes, budget, manpower resources, regulations and policies, laboratory support, surveillance, and operator training. (Prague-FIRL)
W75-01879

FLUORIDATION ENGINEERING MANUAL,
Environmental Protection Agency, Washington, D.C. Office of Water Programs.
E. Bellack.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-228 371, $4.75 in paper copy, $2.25 in microfiche. EPA Report 1972. 94 p, 19 fig, 6 tab, 55 ref.

Descriptors: *Fluoridation, *Water supply, *Treatment facilities, Equipment, Chemicals, Design criteria, Maintenance, Safety, *Water treatment, Publications, Training.
Identifiers: *Fluoride chemicals, Fluoride engineering, *Training manuals.

Quality of fluoridation of water supplies is dependent upon proper use of the facilities and the organization of the water plant. Accurate feed rates, choice of chemical, and choice of equipment are equally important. Described are compounds used in controlled fluoridation, feeders used for adding fluorides, preparation of fluoride solutions, selection of the optimal fluoridation system, and control and surveillance methods. In addition, maintenance, safety and hazards in handling fluoride chemicals, and the technical problems attributed to fluoridation are discussed. (Prague-FIRL)
W75-01886

ULTRAPURE WATER AND REVERSE OSMOSIS TECHNOLOGY,
Microsystems International Ltd., Ottawa (Ontario).
For primary bibliographic entry see Field 5D.
W75-01890

HIGH CAPACITY FLUID TREATER EMPLOYING CONCENTRATED ELECTRIC FIELDS,
A. S. King.
Canadian Patent 984,159. Issued May 28, 1974. Patent Office Record, Vol 102, No 22, p 56-57, May, 1974.

Descriptors: *Patents, *Water treatment, Pressure, *Fluids flow, Laminar flow, *Electrodes, Construction, Waste water treatment.
Identifiers: *Fluid treater.

A fluid treater has multiple flow paths in order to treat large quantities of water utilizing an electric field without substantial pressure drop. The treater is provided with an intake manifold having a configuration which causes essentially laminar flow of the water in the manifold along a spiral path which has convolutions of successively reduced diameter. Outlet ports of the manifold are spaced along this path and are in communication with tubular, outer electrodes. Water passes through these to a similarly arranged discharge manifold where the plural paths are recombined. The water in each path is subjected to a radial electric field in the annular passage defined by its respective inner and outer electrode pair. The tubular wall of each outer electrode is inset to concentrate the electric field in the annular passage. The inner electrode has an electrically conductive outer surface at least coextensive with the tubular wall. The construction permits any of the inner electrodes to be readily replaced without disassembling the treater. (Prague-FIRL)
W75-01895

FEASIBILITY OF OZONE DISINFECTION OF SECONDARY EFFLUENT,
Illinois Inst. for Environmental Quality, Chicago.
For primary bibliographic entry see Field 5D.
W75-01910

THE MEDWAY WATER BOARD TELEMETRY AND TELECONTROL SYSTEM,
Westinghouse Brake and Signal Co. Ltd., Chippenham (England). Automation Div.
D. W. Howard, and M. G. Insley.
Water Services, Vol 78, No 938, p 126-128, April, 1974. 3 fig.

Descriptors: Computers, *Instrumentation, *Treatment facilities, *Control systems, *Automatic control, *Telemetry, Automation, Monitoring, Remote control, Equipment, *Waste treatment.
Identifiers: United Kingdom(Medway).

A remote control, automated, computerized system for water treatment facilities is described. The main features of the system are a 12,000 word store computer with a 30,000 word store disc, a standby control panel, closed circuit television, and power supplies. (Shaffer-FIRL)
W75-01914

OZONE TREATMENT FOR POTABLE WATER,
Water Services, Vol 78, No 938, p 117-118, April, 1974.

Descriptors: *Potable water, Water quality, Water quality control, *Ozone, *Dissolved oxygen, Treatment facilities, *Water treatment.
Identifiers: *Ozonation, Switzerland, Rhine River, Danube River, Lech River, Germany, Netherlands.

A Swiss firm, Kerag, recently completed an ozone drinking water treatment plant for Nuremberg. Water from the confluence of the Danube and Lech rivers is used for drinking purposes in Nuremberg, and the new ozonation process will render this water as fresh and clear as Alpine spring water. Kerag's process involves the use of a high frequency technique of ozone generation. The treated water is simultaneously enriched in oxygen and freed of excess carbonic acid. Kerag has also undertaken a project to provide an ozone water treatment plant for Rotterdam, a city as large as Nuremberg, with one million residents. Kerag is also involved with a large ozone high frequency generation water treatment plant at Zurich. (Shaffer-FIRL)
W75-01918

THE DEVELOPMENT OF A TEST FOR THE POTABILITY OF WATER TREATED BY A DIRECT REUSE SYSTEM,
Cincinnati Univ., Ohio.
For primary bibliographic entry see Field 5A.
W75-01919

VACUUM DISTILLATION/VAPOR FILTRATION WATER RECOVERY,
General American Transportation Corp., Niles, Ill. General American Research Div.
For primary bibliographic entry see Field 5D.
W75-01923

SAFE TO DRINK TREATED WASTEWATER.
American Water Works Association, New York.
For primary bibliographic entry see Field 5D.
W75-01938

THE AMERICAN CITY'S POSITION ON URBAN WATER SUPPLY.
The American City, January 1974, Vol 89, No 1, p 46-48, 1 photo, 6 ref.

Descriptors: *Potable water, Public health, *Viruses, Environmental sanitation, *Water reuse, Water supply, Water conservation, Management, Planning, Water treatment.
Identifiers: *Safe-Drinking Water Act (S-433).

A Senate Committee on Commerce which analyzed 'Safe Drinking Water Act' (S.433) reinforces the magazine's earlier stand that a crash program aimed at the subject of virus removal is badly needed. Reservoirs are no longer free from contamination. Increased population and its ramifications of congestion, transportation increase and recreational demand pose many sanitation threats. Certified operators of water supply systems are required and should meet standards commensurate with the complexity of the system. Although psychological and aesthetic reasons are offered as obstacles to extensive direct wastewater reuse, the public seems more ready to accept wastewater reuse than the waterworks professional. Much of the nation already drinks reused and purified wastewater discharged upstream. Due to withdrawals of water exceeding flows of water, contributions of water wastes also have exceeded the flow. Development of demineralizing process offers opportunities for development of potable supplies from brackish sources. Water systems need to be metered for efficient use and to encourage user conservation. Leakage surveys and studies that insure efficiency of the distribution system should be conducted. Public interest in water supply systems should be conducted. Public interest in water supply systems should be provoked to foster constructive action. Public should have access to waterworks data to determine how effective and efficient the system in in meeting governmental standards. Water supply planning should be coordinated with local and regional planning groups to insure that water projections and regional development plans coincide. (Salzman-North Carolina)
W75-01952

(COMMENT ON THE STORAGE OF MERCURY IN SURFACE WATER),
California State Dept. of Water Resources, Sacramento. Chemistry Lab.
For primary bibliographic entry see Field 5A.
W75-02071

METHOD OF SOFTENING WATER TO PROVIDE EASILY DRAINED AND EASILY FILTERED PRECIPITATES,
Permutit Co., Paramus, N. J. (assignee).
C. O. Weiss, and A. C. Epstein.
U. S. Patent No. 3,839,199, 7 p, 1 fig, 1 tab, 2 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, p 241, October 1, 1974.

Descriptors: *Patents, *Water softening, *Water treatment, *Water quality, *Demineralization, Filtration, Hydrogen ion concentration, Chemical properties, Calcium, Magnesium, Hydrogen ion concentration, Waste water treatment.

Water having calcium and magnesium hardness is first treated with an excess of softening chemical sufficient to raise the pH of the water to at least 11.0 in an inverted, frusto-conical tank containing a granular contact material to remove calcium and magnesium hardness. The water containing the excess of softening chemical is then treated with a sufficient amount of precipitating agent to reduce the pH of the softened water to a range from about 9.8 to about 10.2 in a second inverted, frusto-conical tank containing a granular contact material to remove the excess softening chemical. Any solid magnesium hardness precipitate which passes from the first tank into the second tank, is solubilized in the second tank. Solid particles escaping from the dual tank system are easily filtered, and sludges which are not easily filtered, have been eliminated by the process. (Sinha-OEIS)
W75-02145

RECENT EXPANSION OF PERTH'S SEWERAGE SYSTEM,
Perth Metropolitan Water Supply, Sewerage and Drainage Board, Perth (Australia). Sewerage and Drainage Branch.
For primary bibliographic entry see Field 5D.
W75-02177

5G. Water Quality Control

EFFECTS OF THE HERBICIDE PARAQUAT ON THE ECOLOGY OF A RESERVOIR: II. COMMUNITY METABOLISM,
University of Wales Inst. of Science and Tech., Cardiff. Dept. of Applied Biology.
For primary bibliographic entry see Field 5C.
W75-01674

PROPOSED REGULATIONS FOR THE DISPOSAL OF WASTEWATER IN SUBDIVISION.
Missouri Clean Water Commission, Jefferson City.
June 1974. 8 p.

Descriptors: *Missouri, *Waste treatment, *Environmental sanitation, *Sewage disposal, *Adoption of practices, Administrative agencies, Governments, Legal aspects, Water policy, Water management(Applied), Wastes, Building codes, Design, Engineers's, Estimates, Legislation, Water pollution sources, Laws, Statutes, Permits, Planning, Regulation, Legal review, Water supply, Water law, Waste disposal, Treatment, Water pollution, State governments.

The proposed act places upon the developer of any subdivision the responsibility to assure that the method for waste and sewerage disposal adequately safeguards the ground water from pollution. For the purposes of the act a development is defined as a place of land subdivided by its owner into ten or more lots or dwellings or where ten contiguous lots are owned or controlled by one developer. The act exempts subdivisions which have sold more than 20% of their lots prior to the effective date of enactment. An exemption does not waive requirements of other statutes controlling waste disposal. Developers are required to submit to the Missouri Clean Water Commission a detailed, engineer's report specifying the type, facilities, and capabilities of the development's disposal system. Once the report is approved, the developer may not substantially deviate from the proposed method of disposal without specific written approval from the agency of the Commission. The act provides that any disposal system disapproved may be taken on appeal to the Clean Water Commission. The statute impresses upon developers a continuing responsibility for at least some of the environmental impact their developments cause and allows state supervision over growing demands upon existing waste disposal systems. (Salley-Florida)
W75-01701

HARRELL V. HESS OIL AND CHEMICAL CORP. (CLASS ACTION TO RECOVER DAMAGES FOR POLLUTION OF CREEK).
For primary bibliographic entry see Field 6E.
W75-01703

THE STOCKHOLM CONFERENCE: SOME IMPLICATIONS FOR THE LAW OF THE SEA,
For primary bibliographic entry see Field 6E.
W75-01704

WATER POLLUTION.
Environmental Protection Agency, Washington, D.C.
For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 Price $0.75. (1973). 14 p.

Descriptors: *Federal Water Pollution Control Act, *Regulation, *Permits, *Water quality control, State governments, Waste water disposal, Waste water treatment, Waste water disposal, Waste water treatment, Waste water discharge, Treatment facilities, Navigable waters, Legislation, Water conservation, Recreation, Swimming, Wildlife conservation, Adoption of practices, Industrial waste, Water quality standards.
Identifiers: *Administrative regulations, Hazardous substances(Pollution).

The Federal Water Pollution Control Act of 1972 extends the nation's program against water pollution to all navigable water bodies in the United States. Previously only interstate waters were covered by federal legislation. The 1972 law created national effluent limitations and national performance standards for industries and publicly owned waste treatment plants. The past federal water pollution control program was based on federal-state water quality standards. The law proclaimed two goals. One was that by July 1, 1983 water should be, wherever possible, clean enough for swimming and other recreational use, and clean enough to protect fish, shellfish and wildlife. The other goal was that by 1985 there should be no more discharges whatsoever of pollutants. Water quality standards set by states are now subject to approval by the Environmental Protection Agency. Under the 1972 law no discharge is allowed without a permit. The permit program is the key to enforcement. Both publicly owned treatment plants as well an industrial dischargers must obtain a permit. (Sperling-Florida)
W75-01707

THE HOUSTON CHANNEL, HOW CLEAN IS CLEAN.
Business Week, p 43, March 3, 1973. 1 photo, 1 map.

Descriptors: *Texas, *Ships, *Water quality control, *Water pollution sources, *Economic aspects, Gulf of Mexico, Navigable waters, Chemical wastes, Municipal wastes, Fishing, Swimming, Environmental sanitation, Permits, Cost-benefit analysis, Industrial treatment, Channels, Organic waste, Administrative agencies, Standards, Adoption of practices.
Identifiers: Administrative regulations, Hazardous substances(Pollution).

The Houston channel is a twenty-four mile creek that enables ocean going vessels to navigate from the Gulf of Mexico to the city's doorstep. This has resulted in one-hundred and forty plants, about half of them refineries, jamming the channel's banks. Houston is the nation's sixth largest city and the third busiest port. This growth turned the channel into the nation's most famous industrial sewer. Fish life vanished, chemicals corroded the hulls of ships, and toxic wastes threatened Galveston Bay. Industry mounted an enormous cleanup, spending one-hundred and fifty million dollars over the last five years purging the channel of 85% of its organic waste. The Environmental Protection Agency is about to issue discharge permits requiring that the channel's remaining organic waste be cut by nearly half. Many companies oppose the new limits. The big question is how clean the channel needs to be. Company officials say it will be clean enough to protect Galveston Bay for fishing and swimming. In addition, the companies argue that the channel was dug to bring ships to Houston, not to create a sportsman's paradise. (Sperling-Florida)
W75-01709

A REPORT TO: THE PRESIDENT AND THE CONGRESS, BY THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, FIRST ANNUAL REPORT.
National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01711

PRESIDENT'S SLASH OF CLEAN-WATER FUNDS MAY SHIFT DEBATE FROM CONGRESS TO THE COURTS, (PART I),
For primary bibliographic entry see Field 6E.
W75-01712

MEMORANDUM OF AGREEMENT (EPA-OREGON DEPT. OF ENVIRONMENTAL QUALITY COOPERATION IN PREPARATION AND ISSUANCE OF MUNICIPAL AND INDUSTRIAL WASTE DISCHARGE PERMIT).
For primary bibliographic entry see Field 6E.
W75-01713

UNITED STATES V. RESERVE MINING CO. (DISCHARGE OF REFUSE INTO NAVIGABLE WATERS).
For primary bibliographic entry see Field 6E.
W75-01714

SCENIC HUDSON PRESERVATION CONFERENCE, ET AL. V. CALLAWAY (CHALLENGE TO CONSTRUCTION OF HYDROELECTRIC FACILITY).
For primary bibliographic entry see Field 6E.
W75-01715

STANDARDS AND EFFLUENT CHARGES FOR POLLUTION ABATEMENT,
Florida Southern Coll., Lakeland.
D. L. Scott, and C. R. Britton.
Arizona Business, Vol 19, p 15-23, November 1972.

Descriptors: *Economics, *Planning, *Economic efficiency, *Regulation, *Water pollution sources, Aesthetics, Adoption of practices, Direct costs, Water quality, Control, Conservation, Cost-benefit analysis, Resource allocation, Water treatment, Social aspects, Economic aspects, Waste water pollution, Assessments, Taxation, Non-structural alternatives, Environmental sanitation, Tax rate, Effluents, Waste water discharge, Waste water(Pollution).

Economists explain the pollution problem as a discrepancy between social and private costs of production. Economists favor taxation or the imposition of effluent charges as a method of internalizing external costs. Environmentalists protest that the effluent charge allows companies to buy the right to pollute. The chief advantage of an ef-

fluent charge is that it provides for a more efficient allocation of resources than does a uniform standard. For water quality control in the Delaware Estuary an effluent charge system would produce a given level of water quality for about one-half the cost of a uniform treatment method. There would be no great administrative burden as each polluter will decide, on a least-cost solution, the proper control level to minimize taxes and pollution control costs. For more complete emission control, the regulating authority needs only to increase the size of the effluent charge. Two difficulties present themselves with an effluent charge system. First, placing a value on pollution which causes death and damage to esthetics, is highly subjective. Secondly, the setting of the level of the effluent charge will be difficult when there is no remedial technology. (Sperling-Florida)
W75-01716

SOME BASIC ISSUES IN WATER POLLUTION CONTROL LEGISLATION,
Queensland Univ., Brisbane (Australia).
W. E. Westman.
American Scientist, Vol 60, p 767-773, November/December, 1972.

Descriptors: *Technology, *Ecology, *Water quality control, *Water Quality Act, Cost-benefit analysis, Legislation, Water resources development, Reclamation, Environmental effects, Water conservation, Water purification, Water pollution, Recreation, Swimming, Fishing, Water resources, Planning, Economic aspects, Water requirements, Industrial use, Water demand, Public health, Irrigation.

There are both technological and ecological viewpoints in describing water quality goals. The traditional view characterizing the Water Quality Act of 1965 and the Clean Waters Act of 1971 has been the technological one. The technologist defines ultimate water quality goals in terms of uses to which a stream is to be put by man. Examples of this include irrigation, industrial processing, swimming, boating, drinking, fishing, and support of wildlife. The ecological viewpoint seeks the restoration and maintenance of the physical, chemical, and biological integrity of the waterways. The ecologist assumes that if the balance of nature is restored and maintained, the water will be clean enough for all of man's desired uses. The technologist argues that the level of cleanliness sought by the ecologist is unnecessarily high for many of the desired uses and therefore too costly. The ecologist counters that once pollution begins, the destruction cannot be controlled, and costs for rehabilitating the water will continue to accrue. (Sperling-Florida)
W75-01718

WATER QUALITY STANDARDS--ADOPTION, IDENTIFICATION, AND AVAILABILITY OF STATE STANDARDS.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 182, p 26358-26360, September 20, 1973. 4 p, (Part 120-Water Quality Standards).

Descriptors: *Water quality standards, *Federal Water Pollution Control Act, *Water quality control, *Regulation, Standards, Administration, Administrative agencies, Water pollution sources, State governments, Federal government, Adoption of practices, Coordination, Decision-making, Environmental sanitation, Water conservation, Waste water treatment, Waste water disposal, Specifications, Legal aspects.
Identifiers: *Administrative regulations, *Hazardous substances(Pollution).

Under the Federal Water Pollution Control Act, any water quality standards applicable to interstate waters, adopted and submitted by states, and awaiting approval by the Administrator of the Environmental Protection Agency, are to remain in effect. The Administrator has until January 18, 1973 to determine if such standards are not consistent with the applicable requirements of the Act. States are required to submit to the Administrator any water quality standards applicable to intrastate waters. They will also be automatically in effect unless the Administrator determines that the standards are not consistent with applicable requirements and so notifies the state. The state has ninety days to adopt suggested changes after which the Administrator is to promulgate standards. The public has been invited to review the standards which have been submitted, and to provide comments upon such standards. In January, 1973, Regional Administrators notified some states that revisions were needed in their water quality standards. The changes were made and the revised standards are set forth. (Sperling-Florida)
W75-01721

AREAWIDE WASTE TREATMENT PLANNING AREAS AND RESPONSIBLE AGENCIES.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 178, p 25681-25683, Sept 14, 1973.

Descriptors: *Planning, *Water quality control, *Adoption of practices, *Regulation, *Coordination, Water management, Decision making, State governments, Legislation, Standards, Waste water disposal, Environmental sanitation, Administration, Administrative agencies, Federal government, Water policy, Natural resources, Water resources development, Water quality, Water law.
Identifiers: *Federal Water Pollution Control Act Amendments of 1972, *Administrative regulations.

The Environmental Protection Agency is proposing policies and procedures for the designation of areawide waste treatment management areas. The authority for this regulation is derived from the Federal Water Pollution Control Act Amendments of 1972. The regulations serve as guides to governors of the states and chiefs of local governments. Their purpose is to identify areas which, as a result of urban-industrial concentrations or other factors, have substantial water quality control problems that require an areawide approach in planning. The intent of the legislation is to provide cost effective, point source treatment, control of non-point sources, and coordinated waste treatment management. Written comments on proposed rulemaking were invited and received, and some were incorporated. Areas in need of designation as a planning area must have a substantial water quality control problem. Such a problem exists where the complexity and nature of the water quality control problem makes itself amenable to areawide planning, and where water quality has been degraded to the point where desired uses are impeded or impaired. (Sperling-Florida)
W75-01722

LIABILITY LIMITS FOR SMALL ONSHORE STORAGE FACILITIES--FINANCIAL LIABILITY OF SMALL FACILITIES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01723

OCEAN DUMPING--CRITERIA.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 94, p 12872-12877, May 16, 1973.

Descriptors: *Administrative agencies, *Regulation, *Dumping, *Oceans, *Permits, Standards, Adoption of practices, Water pollution sources, United States treaties, International law, Administration, Public health, Aesthetics, Ecology, Environmental sanitation, Safety, Economic aspects, Beaches, Shorelines, Planning, Radioactive wastes, Waste water pollution.
Identifiers: *Federal Water Pollution Control Act Amendments of 1972, *Administrative regulations, *Coastal waters, *Hazardous substances(Pollution), Contiguous zone.

Criteria are issued for the evaluation of permit applications for ocean dumping. These criteria also fulfill the requirements of the Federal Water Pollution Control Act Amendments of 1972 for determining the degradation of the waters of the territorial sea, the contiguous zone, and the oceans. These are issued as interim criteria and are subject to public comment. These criteria are also subject to revision by regulations promulgated by international treaties to which the United States may become a party. The policy of the Environmental Protection Agency is to regulate ocean dumping of any material which adversely affects human health, welfare, amenities, the marine environment, ecology, economic potentialities, fish or beaches. For some materials no permits will be issed. These materials include radioactive wastes, materials for chemical or biological warfare, or materials which float or remain in suspension. Chemicals are listed which cannot be dumped if present in more than trace quantities. (Sperling-Florida)
W75-01726

COASTAL ZONE MANAGEMENT PROGRAM DEVELOPMENT GRANTS--PROPOSED RULES.
National Oceanic and Atmospheric Administration, Washington, D.C.
Federal Register, Vol 38, No 113, p 15588-15594, June 13, 1973.

Descriptors: *Coasts, *Administrative agencies, *Federal government, *Adoption of practices, *Project planning, Federal Water Pollution Control Act, Oceans, Land management, Water pollution sources, Recreation, Aesthetics, Public health, Aquatic habitat, Decision-making, Regulation, Standards, State governments, Economic aspects, Water pollution control, Waste water disposal, Government finance.
Identifiers: *Administrative regulations, *Coastal zone management, *Hazardous substances(Pollution), *FWPCA Amendments of 1972.

The National Oceanic and Atmospheric Administration has set out guidelines for coastal zone management program development grants. The coastal zone is rich in a variety of natural, commercial, recreational, industrial, and aesthetic resources. Present state and institutional arrangements for planning and regulating land and water uses in the coastal zone are often inadequate. They are especially inadequate to deal with the competing demands and the urgent need to protect natural systems in the ecologically fragile area. Once a coastal state has developed a management program it is submitted to the Secretary of Commerce for approval. Contained within the management program are the boundaries of the state's coastal zone, definitions of permissible land and water uses which have a direct and significant impact on coastal waters, and criteria for the designation of areas of critical state concern. State created programs must give full consideration to ecological, cultural, historic, and aesthetic values, as well as economic development needs. These proposed rules will not conflict with requirements for water pollution control established by the Federal Water Pollution Control Act. (Sperling-Florida)
W75-01728

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM--PROPOSED RULES.
Environmental Protection Agency, Washington, D.C.

Federal Register, Vol 38, No 7, p 1362-1370, January 11, 1973.

Descriptors: *Regulation, *Federal government, *Legislation, *Administrative agencies, *Permits, Water law, Effluents, Federal Water Pollution Control Act, Discharge(Water), Waste water(Pollution), Treatment, Water pollution treatment, Treatment facilities, Pollutants, Water quality, Water quality standards, Oceans, Sewage treatment, Industrial wastes, Water pollution, Water pollution sources.

Section 402 of the Federal Water Pollution Control Act Amendments of 1972 creates a National Pollutant Discharge Elimination System. Under the statute, the Administrator of the Environmental Protection Agency may, after opportunity for public hearings, issue permits for the discharge of any pollutant, upon condition that such discharge will meet all applicable requirements of the Act relating to effluent limitations, water quality standards and implementation plans, new source performance standards, toxic and pretreatment effluent standards, inspections, monitoring and entry provisions, and guidelines establishing ocean discharge criteria. This section constitutes the proposed rules for the issuance of such permits. The proposed rule outlines provisions for the processing of permits, the terms and conditions of permits, and notice and public participation. The rules apply to municipal and other publicly owned waste treatment works, industries discharging directly to navigable waters, and concentrated animal feeding operations. (See also W75-01730) 9flowers-Florida)
W75-01729

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM--PROPOSED RULES AND REGULATIONS.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 85, p 10960-10964, May 3, 1973.

Descriptors: *Federal Water Pollution Control Act, *Water pollution sources, *Permits, *Regulation, United States, Legislation, Decision making, Coordination, Environmental sanitation, Farm wastes, Aquaculture, Water conservation, Water quality control, Administrative agencies, Waste water disposal, Cost-benefit analysis, Direct costs, Direct benefits, Oily wastes, Injection wells, Water pollution.
Identifiers: *Administrative regulations, *Federal Water Pollution Control Act Amendments of 1972, *Hazardous substances(Pollution).

These regulations are forms and guidelines issued by the Environmental Protection Agency pursuant to the Federal Water Pollution Control Act for the acquisition of data from owners of point sources subject to the national pollutant discharge elimination system. Some pollutant discharges may be allowed to continue by the issuance of a permit. There is a general exclusion for agricultural activities. The benefits to water quality will not outweigh the great potential administrative burden. The buildup of solid and liquid wastes from large animal feeders presents a significant source of pollution and separate rules are made for sheep, turkey, dairy cattle, hens, and ducks. Fish and aquatic animal production facilities are excluded because of their small impact on water quality. If an excluded source is a significant source of pollution, it may be identified and required to be submitted for approval. States may exclude from the permit requirement: sewage from vessels, discharges from marine engines, and material injected in a well to facilitate the production of oil or gas. (See also W75-01729) (Sperling-Florida)
W75-01730

GENERAL POLICIES--PROPOSED RULES AND REGULATIONS.
Susquehana River Basin Commission, Harrisburg, Pa.
For primary bibliographic entry see Field 6E.
W75-01734

FATTY OIL-WATER SEPARATION PROCESS,
Gkb Enterprises, Inc., Placentia, Calif. (assignee)
For primary bibliographic entry see Field 5D.
W75-01768

CLEANING UP THE WILLAMETTE,
A. Netboy.
American Forests, Vol 78, p 12-15, 57, May 1972. 1 illus, 2 photo.

Descriptors: *Rivers, Wastes, *Waste disposal, *Water pollution, *Water pollution control, *Pulp wastes, *Oregon, Industrial wastes, Water pollution sources, Water quality standards, Permits, Fish, Fisheries, Public health, Sewage, Sewage disposal, Sewage treatment, Water.
Identifiers: *Willamette River.

The Willamette River, which flows entirely in the state of Oregon, was once polluted by paper mills, fruit canneries and the untreated sewage of riverside communities. Although the Refuse Act of 1899 required permits from the Army Corps of Engineers for waste discharges into navigable waters, until recently there was never any attempt to force compliance. The halt to destruction of the Willamette began in 1948 when the State Sanitary Authority, created by voter initiative ten years earlier, adopted water quality and waste disposal standards. Municipalities were slowly nudged into building treatment plants to reduce the pollution load. However, the pulp mills were later found to contribute ninety percent of the pollution in the river, which had caused serious damage to the river's salmon population. The river was found by a state committee to be a menace to public health and a biological cesspool. Negotiations following a threatened court suit forced the mills to shut down their turbines during certain periods of fish migration. Extensive construction of sewage treatment facilities, coupled with compliance by industry of regulations, sparks the hope that recreation and commercial fishing will again take over the Willamette. (Ritchie-Florida)
W75-01776

FEDERAL COMMON LAW APPLICABLE TO INTERSTATE POLLUTION CASES-ILLINOIS V. CITY OF MILWAUKEE, 406 U.S. 91 (1972),
J. A. April.
Suffolk University Law Review, Vol 7, p 790-805, Spring 1973. 118 ref.

Descriptors: *Federal jurisdiction, *Water pollution, *Interstate, Common law, Legislation, Legal aspects, Judicial decisions, Pollution abatement, Sewage, Federal government, Governments, State governments, Water policy, Water pollution control, Water law.
Identifiers: *Nuisance(Legal aspects).

In a recent federal case, the United States Surpreme Court was faced with whether the Court should exercise its permissible, nonmandatory original jurisdiction in an action brought by the State of Illinois against four Wisconsin cities and two local sewerage commissions. The Court declined to exercise its original jurisdiction because it found that the federal district courts had jurisdiction over the subject matter and appropriate equity powers to resolve the dispute. The significance of this case and the nature of the common law action to abate such a nuisance are described. The elements discussed include jurisdiction, standing to seek a federal common law remedy, the localized nature of nuisances and the ramifications of that peculiarity, certain evidentiary problems, causation, and the possibility of seeking monetary damages in addition to injunctive relief. (Whisler-Florida)
W75-01777

ADDITIONAL POWERS OF MUNICIPALITY UPON RECEIPT OF ORDER TO CEASE POLLUTION.
For primary bibliographic entry see Field 6E.
W75-01778

REPORT TO THE CONGRESS--IMPROVED FEDERAL AND STATE PROGRAMS NEEDED TO INSURE THE PURITY AND SAFETY OF DRINKING WATER IN THE UNITED STATES, (ENVIRONMENTAL PROTECTION AGENCY).
Comptroller General of the United States, Washington, D.C.
For primary bibliographic entry see Field 5F.
W75-01779

LIABILITY OF WATER SUPPLIER FOR DAMAGES RESULTING FROM FURNISHING IMPURE WATER,
For primary bibliographic entry see Field 6E.
W75-01780

COSTLY NEW CHALLENGE FOR WATER POLLUTERS.
For primary bibliographic entry see Field 6E.
W75-01783

EFFLUENT CHARGES, TOWARDS A NEW ENVIRONMENT,
C. E. Nilson.
Manuscript, 1970. Holland Law Center, University of Florida. 34 p, 113 ref.

Descriptors: *Pollution taxes(Charges), *Organic wastes, *Waste water treatment, *Municipal wastes, *Industrial wastes, Water quality control, Environmental sanitation, Water conservation, Waste water disposal, Sewerage, Water pollution sources, Water pollution control, Rivers, Streams, Government finance, Conduits, Water supply, Water storage runoff, Percolating water, Economic aspects, Precipitation, Secondary treatment, Tertiary treatment.
Identifiers: *Hazardous substances(Pollution).

Municipalities are the biggest polluters, emptying millions of gallons of raw untreated sewage into rivers and streams each day. Technical knowledge for the removal of this type of pollution now exists. The only obstacle to the clean up of a large portion of the country's municipal waste is the lack of funding on the part of municipalities. The connection, in many cities, of sewers and storm drains causes treatment facilities to be overloaded during periods of heavy rainfall. Efforts can be made to slow down the runoff of rain water to allow it to sink back into the groundwater supply and thus alleviate both the groundwater problem and the storm drainage overflow at the same time. By applying presently available technology to municipal sewage, by way of primary, secondary, and tertiary treatment of the sewage, the domestic contribution to the pollution load of streams can be reduced by upwards of ninety-five percent. The organic load of wastes of industry was over twice the organic load from all of the municipal sewage wastes. The treatment for inorganic wastes in generally more complex and costly than the processes for the treatment of organic wastes. For this reason many organic wastes are poured directly into receiving waters with no treatment. (Sperling-Florida)
W75-01784

PUBLIC PARTICIPATION IN WATER POLLUTION CONTROL.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 6E.

W75-01790

WATER POLLUTION OF BOUNDARY WATERS OF THE GREAT LAKES SYSTEM FROM AGRICULTURAL, FORESTRY AND OTHER LAND USE ACTIVITIES.
International Joint Commission-United States and Canada.
Federal Register, Vol 37, No 110, p 11403-11404, June 7, 1972.

Descriptors: *International Joint Commission, *Canada, *Great Lakes, *Water pollution sources, *United States, Lake Huron, Lake Superior, Impaired water quality, Nutrients, Farm wastes, Pesticide residues, Public health, Recreation, Water pollution effects, Water resources, Water pollution control, Land use, Land management, Adoption of practices, Reclamation, Waste water(Drainage), Surface runoff, Drainage effects, Recreation wastes, Waste disposal.
Identifiers: *Hazardous substances(Pollution).

The International Joint Commission composed of the United States and Canada, will conduct a study of water quality in Lake Huron and Lake Superior. Water pollution of the boundary waters of the Great Lakes from agricultural, forestry, and other land use will also be investigated. Questions to be answered include whether present pollution is causing further lake degradation, and if so, what remedial measures would be most practicable to restore and protect the quality of the waters. The Commission will hold public hearings at which interested persons or agencies may appear to present their views. Pollution from land drainage, including ground and surface run-off, recreational and park development, utility and transportation, as well as natural sources will be studied. The adequacy of existing programs and control measures will be considered. Improvements relating to pest control products, other pollutants, land use and dumping will be considered also. In its study the Commission will identify deficiencies in technology and recommend actions for their correction. (Sperling-Florida)
W75-01793

WATER POLLUTION OF LAKES SUPERIOR AND HURON.
International Joint Commission United States and Canada.
Federal Register, Vol 37, No 110, p 11403, June 7, 1972.

Descriptors: *International Joint Commission, *Great Lakes, *Water pollution sources, *United States, *Canada, *Lake Huron, *Lake Superior, Lake Michigan, Impaired water quality, Public health, Administrative agencies, Water quality control, Water pollution control, Adoption of practices, Environmental sanitation, Ecology, Environmental effects, Pollutants.
Identifiers: *Hazardous substances(Pollution).

The International Joint Commission, composed of the United States and Canada, is going to study water pollution in Lake Huron and Lake Superior. Water quality will also be studied. The Commission will carry out its study by means of investigations and public hearings. The Commission will determine if the lakes' waters are being polluted on either side of the boundary to an extent likely to cause degradation of water quality in these lakes, or in lakes, or in lakes downstream. If the water quality is decreasing, the causes and localities of each pollutant will be determined along with practicable remedial steps to restore and protect the water quality. Polluted water which originates in Lake Michigan will be studied to determine its effects on the lower lakes. The Commission will hold public hearings at which interested persons or agencies may inform the Commission of the nature of their interest. (Sperling-Florida)
W75-01794

DEPOSITING DEAD ANIMALS OR OFFENSIVE MATERIALS IN OR NEAR WATER.
For primary bibliographic entry see Field 6E.
W75-01800

MODELS FOR PLANNING AND RESEARCH FOR THE SOUTH FLORIDA ENVIRONMENTAL STUDY,
Florida Univ., Gainesville. Resource Management Systems Program.
For primary bibliographic entry see Field 6A.
W75-01803

QUALITY CONTROL APPLIES TO RIVER POLLUTION,
Australian Road Research Board, Vermont.
For primary bibliographic entry see Field 5D.
W75-01812

USE OF POWDERED ACTIVATED CARBON TO ELIMINATE ROTENONE TOXICITY IN STREAMS,
New York State Dept. of Environmental Conservation, Albany.
R. Engstrom-Heg.
New York Fish and Game Journal, Vol 21, No 2, p 153-162, July 1974. 4 tab, 6 ref.

Descriptors: *Rotenone, *Activated carbon, *Pesticide removal, *Adsorption, *Water purification, Environmental effects, Brown trout, Pesticides, Water quality control, Laboratory tests, Toxicity, Surfactants.
Identifiers: *Detoxification, Polysorbate 80, Halflife, Salmo trutta.

Suspensions of powdered activated carbon were found to adsorb rotenone and eliminate toxicity to rotenone-sensitive fish in real and simulated stream situations. Laboratory tests showed that carbon-rotenone systems do not quickly reach equilibrium, and that appropriate concentrations and contact times can be estimated more accurately from a rate equation than from adsorption isotherms. In general, application at 30 ppm is adequate and will detoxify commonly used rotenone concentrations in 12-21 minutes. Required contact time is inversely proportional to carbon concentration and does not change greatly with increased rotenone concentration. Polysorbate 80 (Tween 80) and certain liquid dishwashing detergents appear to release adsorbed rotenone into water. Carbon had a half-life in suspension of 22 hours in laboratory jars. It handled well as a 10 percent slurry, but it did not form even moderately stable 30 ppm suspensions in stream water unless introduced through a rotary mixing chamber. Carbon treatment causes a temporary black-to-gray discoloration of the stream bottom. Rotenone adsorption in stream tests correspond well with predictions based on laboratory experiments. Activated carbon treatment is a viable alternative to potassium permanganate detoxification for use in unpolluted, relatively small streams. (Katz)
W75-01834

BIOLOGICAL TREATMENT TECHNOLOGY (162),
Environmental Protection Agency, Cincinnati, Ohio. Municipal Permits and Operations Div.
For primary bibliographic entry see Field 5D.
W75-01838

MANPOWER REQUIREMENTS FOR WASTE WATER COLLECTION SYSTEMS IN CITIES AND TOWNS UP TO 150,000 IN POPULATION.
North Carolina Agricultural and Technical State Univ., Greensboro. Center for Manpower Research and Training.
For primary bibliographic entry see Field 5D.
W75-01840

U.S. GEOLOGICAL SURVEY ROLE IN PLANNING,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 6B.
W75-01852

VIRGIN RIVER PROJECT: A REGIONAL APPROACH TO MULTI-OBJECTIVE PLANNING FOR WATER RELATED RESOURCES,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 6A.
W75-01856

FISHERIES ACT IS KEY TO WATER QUALITY,
Department of the Environment, Ottawa (Ontario).
P. M. Higgins.
Modern Power and Engineering, Vol 68, No 4, p 44-45, April, 1974.

Descriptors: *Federal jurisdiction, *Fisheries, *Water quality control, Industrial wastes, *Canada, *Legislation, Phosphates, Fish, Petroleum, Environmental effects, Pollution control, Regulations, Technology, *Water quality standards, Legal aspects.
Identifiers: *Fisheries Act(Canada), Federal/Provincial/Industrial cooperation.

Containment of pollution and practical technological approaches have been stressed by the federal government of Canada for water pollution control. Legislation specifically discussed is the amended Fisheries Act. These amendments give the federal government a means of controlling specific industrial effluents by defining cerain substances as being deleterious to fish. Regulations involve the paper and pulp industry, the chlor-alkali and the petroleum refining industry. Phosphate levels in detergents have been also regulated. National guidelines are being developed, with participation of industry. This Federal/Provincial/Industrial Task Force then reviews environmental effects and pollution control which influences subsequent regulations and guidelines. (Prague-FIRL)
W75-01872

MECHANICAL SEPARATION PROCESSES,
Monash Univ., Clayton (Australia). Dept. of Chemical Engineering.
For primary bibliographic entry see Field 5D.
W75-01875

COST OF THERMAL EFFLUENT STANDARDS FOR POWER PLANTS,
Stanford Univ., Calif. Dept. of Civil Engineering.
L. Ortolano, and F. A. Smith.
Journal of the Power Division, Proceedings of ASCE, Vol 100, No PO-1, p 15-31, July 1974. 5 tab, 8 ref.

Descriptors: *Thermal pollution, *Water quality standards, *Power plants, *Costs, Systems analysis, Model studies, Design criteria, Flow rate, Effluents, Temperature, Water cooling, Ecological effects, Waste water treatment.
Identifiers: *Thermal pollution abatement, *Steam-electric plants, Cost estimating, Condenser pressure.

The results of a study to explore thermal pollution abatement possibilities for proposed steam-electric generating plants and to develop methods for approximating estimates for associated costs are summarized. Functional relations between abatement costs and degrees of effluent control were estimated. Case study applications for alternative cooling system designs were presented. Conclusions can be summarized in terms of: the cost-estimating procedure itself; the abatement cost results suggested by the case studies; and some policy issues in relation to thermal water quality standards. Results of the case studies show that thermal ef-

fluent modification costs generally increase at an increasing rate as functions of both decreases in design effluent temperature and decreases in design effluent flow rate. Effective abatement programs for proposed plants require modifications in both steam cycle and cooling system components. The most important design variable is the condenser pressure. Policy implications involve predictive capabilities including estimation of economic costs; prediction of receiving water temperature profiles as a function of effluent temperature and flow rate; and prediction of ecological impacts from changes in receiving water temperature. Using the model presented, one should determine the physical and ecological consequences of alternative effluent standards and then evaluate the economic implications. (Prague-FIRL)
W75-01878

EVALUATION OF THE KENTUCKY WATER SUPPLY PROGRAM. DRINKING WATER.
Environmental Protection Agency, Atlanta, Ga. Bureau of Water Hygiene.
For primary bibliographic entry see Field 5F.
W75-01879

WE'RE RED-TAPED TO A STANDSTILL,
W. J. Storck.
Water and Wastes Engineering, Vol 11, No 66, p 47-48, June, 1974.

Descriptors: *Conferences, *Financing, *Government finance, Waste water treatment, Legislation, Standards, Federal government, Priorities, Water pollution control, Treatment facilities.
Identifiers: *PL 92-500.

The Water Pollution Control Federation's annual Government Affairs Seminar had as this year's topic 'Energy, Money, and Pollution.' One of the major problems in Federal funding of municipal waste water treatment facilities is that the present level of funding is not keeping up with inflation. The water pollution program has been halved by a series of overt executive impoundments; however, bureaucratic red-tape is slowing the program down even further. Also, the energy shortage will affect waste water treatment plants in ways other than short supplies of fuel oil, electricity, and natural gas. There is likely to be an increased competition for funds at the Federal level as the energy research and development program calls for an expenditure of more than $10 billion over a five-year period. Finally, many participants felt that PL 92-500 must be amended. (Sandoski-FIRL)
W75-01887

THE LONG-RUN ASYMMETRY OF SUBSIDIES AND TAXES AS ANTIPOLLUTION POLICIES,
Michigan Univ., Ann Arbor. Dept. of Economics.
R. C. Porter.
Water Resources Research, Vol 10, No 3, p 415-417, June, 1974. 1 tab, 11 ref.

Descriptors: *Taxes, *Effluents, *Industrial wastes, Waste disposal, Pollution abatement, Mathematical studies, Economics, *Pollution taxes(Charges).

Primers on the discharge of unwanted but unpriced effluents into the air and water now treat as commonplace the symmetry between taxes on effluents and subsidies for abatement as means of reducing an industry's pollution. This note shows that on the contrary, serious asymmetry results when entry and exit occur in response to subsidies or taxes. Not only does the quantitative symmetry disappear, but even the qualitative impact (the directions of the effects) of charges and bribes on the volume of firm and industry effluents may differ. More specifically, the possiblity emerges than an abatement subsidy offered to an industry may increase the total effluents of that industry. (Sandoski-FIRL)
W75-01904

PLASTIC-MEDIUM TRICKLING FILTERS FOR BIOLOGICAL NITROGEN CONTROL,
Dow Chemical Company, Midland, Mich. Environmental Control Systems.
For primary bibliographic entry see Field 5D.
W75-01920

WATER QUALITY MANAGEMENT PLAN FOR AIKEN COUNTY, SOUTH CAROLINA, PART I.
South Carolina Administration Div., Columbia. Office of State Planning.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-226 608, $5.25 in paper copy, $2.25 in microfiche. Prepared for the Lower Savannah Regional Planning and Development Council, Aiken, South Carolina, June, 1973. 108 p, 31 fig, 18 tab. HUD SCP-1003.

Descriptors: *Water quality standards, *Water quality, *Water utilization, *Water pollution, *Waste water disposal, *South Carolina, Sewage treatment, Growth rates, Planning, Pollutants, Water management(Applied).
Identifiers: *Water quality management, *Aiken County(SC), *Horse Creek(SC), Health standards.

The need for adequate water quality standards and a viable water quality management plan are evident in fringe areas somewhat removed from urban centers and in satellite communities found throughout Aiken County. Improper use of water resources and a nonmanagement policy have resulted in series pollution problems and absence of adequate water supply and waste water disposal systems has slowed economic growth. The basic study elements included in this evaluation of Aiken County's water and sewer needs include physical characteristics; social, political, and economic characteristics; existing water quality and waste water facilities; engineering and management alternatives; and recommendations for funding and implementation of the plan. Such information and analysis will help in attaining these major objectives: efficient and orderly expansion of water and sewer facilities, improved health and living standards, elemination of pollution of receiving streams, orderly industrial and residential growth, and adequate assessment of proposed projects in the Regional Council's A-95 review capacity. Water quality problems focus primarily on Horse Creek where efforts to upgrade stream quality have failed due to fragmentation of authorities responsible for water and sewer services, a lack of coordination and planning, and absence of an overall policy for water quality. Definition of pollutants in the Horse Creek Watershed and the most cost effective means of returning Horse Creek to its propose classification and use are discussed in Part II, an engineering study. (Diefendorf-North Carolina)
W75-01932

WATER POLLUTION PROBLEMS IN THE REPUBLIC OF SINGAPORE,
Mander, Raikes and Marshall, Bristol (England).
M. A. Kershaw.
Effluent and Water Treatment Journal, Vol 14, No 6, p 301-308, June, 1974. 2 fig, 1 tab, 6 ref.

Descriptors: *Water conservation, *Water pollution, *Water pollution control, *Public health, Water pollution treatment, Water utilization, Impaired water quality, Effluents, Nonconsumptive use, Sewage treatment, Waste water treatment, Water quality, Water quality control, Water pollution effects, Economics, Economic impact, Water analysis, Potable water, Reclaimed water, Domestic water, Environmental sanitation.
Identifiers: *Republic of Singapore, Economic development, Southeast Asia.

Water supply is a critical factor in public health and economic development, and the price paid for progress in developing countries is a deterioration in raw and treated water quality. Water demand is a major problem for the Republic of Singapore: reservoirs have been built, catchment areas have been defined, and other measures adopted to conserve water. Also considered is the possibility of conserving rainfall and using it as an additional source of industrial, and perhaps potable, water. The Republic is further plagued with septicity of effluents, algae growth in final effluent channels, and effluent from sugar and other industries. In 1972, the government created a Ministry of the Environment to deal with pollution control and environmental health through an enforcement, education, and equipment program. Regulations of 1970 contain heavy penalties, including power to close factories not conforming with quality standards. In 1968, publicity campaigns were developed to deal with litter and pollution, and an advisory service provided through the Singapore Institute of Standards and Industrial Research (SISIR) has been instituted to help industry with effluent treatment. SISIR has increased its technical facilities, conducted pollution studies, and advised over seventy factories. (Grden-North Carolina)
W75-01941

ACCOMODATING TO NEW IMPERATIVES IN WATER POLLUTION CONTROL,
Cincinnati Univ., Ohio. Medical Center.
E. J. Cleary.
Journal of the American Water Works Association, Vol 66, No 7, p 437-440, July, 1974. 6 ref.

Descriptors: *Waste water treatment, *Water pollution control, *Pollution abatement, *Water pollution, *Water quality control, *Water quality, Waste dilution, Water quality act, Water treatment, Water purification, Sewage treatment, Wastes, Waste water disposal, Waste disposal, Effluents, Waste water, Environmental sanitation, Water treatment, Environment, Environmental effects.
Identifiers: *Zero discharge, *1972 Federal Water Pollution Control Act, PL 92-500.

The complete elimination of waste water discharge into waterways is stipulated in the 1972 Federal Water Pollution Control Act Amendments, but the idea was first advanced by Sir Edwin Chadwick a century ago. Present skepticism revolves around whether PL 92-500 delineates realistic national objectives and appropriate measures for dealing with pollution. Congress premised pollution control on application of best practicable treatment technology for all waste water prior to discharge and that successively more stringent limitations be applied to effluent with the ultimate goal of achieving zero discharge of pollution. This policy decision is amplfied with an array of action-forcing directives delineating corporate deadlines and government implementation details. Reactions to PL 92-500 have been unfavorable; industrial interests are not reflected in the Act; the federal administration is having difficulty with the numerous tasks of implementing the Act, while state and local governments are stalemated by uncertainties, lack of guidelines and determination of acceptable planning proposals, and availability of federal funding. But some environmentalists are pleased. Many feel this singled-out goal could have disastrous economic and environmental effects, and no data shows that the cost increases to attain zero discharge produce commensurate increases in social benefit. While PL 92-500 is ambitious, it is regrettable that its merits were not incorporated with economic, environmental, and administrative realities. (Grden-North Carolina)
W75-01942

MAKE WATER POLLUTION CONTROL A MEANINGFUL LOCAL RESPONSIBILITY,
Muncie Sanitary District, Ind. Water Quality Div.
J. M. Craddock.
The American City, May, 1974, Vol 89, No 5. p 63-65, 13 photo.

Descriptors: *Local governments, *Standards, *Water policy, *Law enforcement, *Water pollution, *Pollution abatement, Research and development, Water quality, *Indiana, Pollutant identification, Abatement.
Identifiers: *Muncie(Ind), White River(Ind).

Local governments, working cooperatively with state and federal agencies, should handle aspects of environmental control and protection. Not wanting to be removed from the decision making process, the government of Muncie, Indiana, established steps to control water pollution. A newly created Division of Water Quality serves as a testing and enforcement agency. Basic aspect of the program is to prevent pollution within the sanitary district which is larger than Muncie city limits and encompasses the White River and eight of its tributaries. By identifying polluting out-flows, the division has authority to enforce fines for noncompliance with standards. To tackle the greatly polluted river, seven base-line stations have been established to test waters regularly. The second aspect of the program is industrial monitoring by placing automatic samplers on discharges. The division also administers the Environmental Protection Agency's required industrial surcharge for waste water treatment. The third aspect, self-examination, requires the division to conduct careful tests of the quality of the effluent discharged by city's waste water treatment plant. Research is also done. This local control program benefits the community and the natural environment at least five fold: (1) increased public health, (2) added recreational value of community's water resources, (3) added revenue through equitable industry-waste charges, (4) relief from outside pressures, and (5) clean water for future generations. (Salzman-North Carolina)
W75-01948

DRINKING WATER GOOD, BUT NOT PERFECT,
W. L. Forestell.
The American City, January 1974, Vol 89, No 1, p 33-36, 3 photo, 4 tab.

Descriptors: *Financing, *Water management(Applied), *Waste water treatment, *Quality control, *Water treatment, Local governments, Administration, Filtration, Training.
Identifiers: National Safe Drinking Act, Funding, Federal funding.

Money and training were the biggest blocks to system improvement according to a recent survey of 1000 water superintendents across the county (372 respondents). This forced officials to seek assistance, but not regulation from state and federal agencies. Fifty five per cent of respondents opposed more federal enforcement of drinking water standards feeling state health and regulatory agencies were doing an excellent job. In contrast, passage of a national Safe Water Drinking Act was favored by 65% of cities with populations of 50,000 to 100,000. Increased federal funding was favored by 81% of 50,000 to 100,000 population cities compared to only 69% of the total group. Although 61% of respondents have some sort of filtration treatment facilities, only 50% felt filtration should be a requirement for any drinking water. Disinfection, mostly using chlorine, was the only form of treatment in more than 20% of all responses. In systems of less than 25,000 people, 38% did no more than chlorinate, while in systems greater than 50,000, the percentage dropped to less than 20%. Only 20% reported any deterioration of the raw water source in the last decade. 'Increasing chlorides, rising coliform counts, turbidity and algae problems led the list of source deterioration indicators.' Only 14% felt increased population had been detrimental to their raw water source. More than 52% reported improving their facilities for quality. Conclusions are that water industry personnel are doing a very creditable job but more trained, certified plant operators are needed; that water is nowhere as bad as 'sensational' press would have its public believe. (Salzman-North Carolina)
W75-01950

CONTINUOUS WATER QUALITY MONITORING,
Clyde River Purification Board, Glasgow (Scotland).
For primary bibliographic entry see Field 5B.
W75-01955

INVESTIGATION OF METHODS FOR DETERMINING OPTIMUM POWDERED CARBON AND POLYELECTROLYTE DOSAGES IN MILITARY WASTEWATER TREATMENT SYSTEMS,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 5D.
W75-01958

VORTEX SUPPRESSION IN STILLING POND OVERFLOW,
Jyoti Ltd., Baroda (India).
For primary bibliographic entry see Field 5D.
W75-01994

AN HISTORICAL LOOK AT THE WATER QUALITY OF THE DELAWARE RIVER ESTUARY TO 1973,
Academy of Natural Sciences of Philadelphia; Pa. Dept. of Limnology.
For primary bibliographic entry see Field 5B.
W75-02001

EVALUATION OF THE HAZARD OF BULK WATER TRANSPORTATION OF INDUSTRIAL CHEMICALS (A TENTATIVE GUIDE).
National Academy of Sciences, Washington, D.C.
For primary bibliographic entry see Field 5B.
W75-02002

COOPERATIVE MINE DRAINAGE SURVEY, KISKIMINETAS RIVER BASIN.
Environmental Protection Agency, Wheeling, W. Va.
Available from the National Technical Information Service, Springfield, Va. 22161 as PB-228 767, $9.50 in paper copy, $2.25 in microfiche. April 1972. 315 p, 23 fig, 37 tab, 13 ref, 8 append.

Descriptors: *Acid mine water, *Coal mines, *Pollution abatement, *Mine wastes, *Water quality, Mine drainage, Industrial wastes, Water pollution sources, Streams, Coal mine wastes, Water pollution, Hardness(Water), Freshwater, Sulfates, Iron, Aluminum, Hydrogen ion concentration, Pennsylvania, Chemical analysis, Drift mining, Strip mines, Watershed management, Groundwater resources.
Identifiers: *Kiskiminetas River, Acid mine drainage, Abandoned mines, Stream survey, Loyalhanna Creek.

A study was made of the acid mine drainage from coal mines and the water quality resultant in the Kiskiminetas River basin and its major tributaries: Loyalhanna Creek, Conemaugh River, Blacklick Creek, Two Lick Creek, Little Conemaugh River, and Stony Creek. Pollution levels from active mines were being rapidly reduced and most of the acid was derived from abandoned mines and coal refuse piles. Abandoned drift mines and shaft mines were typical acid mine drainage sources. The data collected were: number of sources, total discharge in ppm, total net activity, total hardness, sulfates, iron, manganese, and aluminum. Recommendations were made to control the waste drainage. (Katz)
W75-02003

ECONOMIC IMPACT OF FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS ON THE PULP AND PAPER INDUSTRY,
Crown Zellerbach Corp., Camas, Wash. Dept. of Manufacturing Services.
H. R. Amberg.
Tappi, Vol 57, No 9, p 62-66, Sept. 1974. 5 fig, 7 tab, 4 ref.

Descriptors: *Waste treatment, *United States, *Treatment facilities, *Pulp wastes, *Economics, *Federal Water Pollution Control Act, *Legislation, *Water pollution, *Pulp and paper industry, *Regulation, *Pollution abatement, Evaporation, Incineration, Effluents, Costs, Operating costs, Waste water treatment, Water pollution control, Water conservation.

Treatment of dilute pulp and paper mill wastes in the U.S.A. follows conventional methods of primary and secondary treatments developed for municipal wastes. Mills producing chemical pulps are collecting, evaporating, and burning spent pulping liquors for recovery of chemicals and heat, while fiber-bearing waste waters are being treated in clarifiers. These methods should meet the 'best practicable control technology' standards established by the 1972 Amendments to the Federal Water Pollution Control Act. Total operating costs for existing primary and secondary treatment plants range from $3 to $8 per ton of pulp for mills manufacturing 400 to 1000 daily tons. The size of a mill will affect the unit treatment cost. Future requirements will probably call for both internal mill conservation and external treatment measures which will all be more expensive than presently used methods. (Sykes-IPC)
W75-02007

TRACE ELEMENTS IN WATER: ORIGIN, FATE, AND CONTROL: I MERCURY.
Stanford Univ., Calif.
For primary bibliographic entry see Field 5B.
W75-02103

LAND-SURFACE SUBSIDENCE IN THE AREA OF BURNETT, SCOTT, AND CRYSTAL BAYS NEAR BAYTOWN, TEXAS,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 4B.
W75-02126

HYDROLOGY OF THE ABANDONED COAL MINES IN THE WYOMING VALLEY, PENNSYLVANIA,
Geological Survey, Harrisburg, Pa.
For primary bibliographic entry see Field 5B.
W75-02128

DEVICE FOR COLLECTING LOOSE MATERIAL FROM A SURFACE, PARTICULARLY OIL FLOATING ON WATER,
A. A. R. Larsson.
U. S. Patent No. 3,838,775, 5 p, 3 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 927, No 1, p 116, October 1, 1974.

Descriptors: *Patents, *Pollution abatement, *Oil pollution, *Water pollution control, *Water quality control, Oil spills, Oil wastes, Equipment, *Separation techniques.

The device for collecting loose material from a surface, especially oil floating on water, employs a drum-shaped rotor in a relatively closed housing. The housing is provided with an elongated intake opening in the lower portion. The rotor is supported by a horizontal axis parallel to the surface of the water. The method of collecting material comprises of drawing a mixture of oil and any attendant water into a chamber, rapidly agitating it to convert at least a portion of the mixture into an emulsion and simultaneously discharging all of the received material from the chamber and into a surface float-supported receptacle. (Sinha-OEIS)

W75-02142

BOOM AS A BARRIER FOR OIL SLICKS AND THE LIKE ON THE SURFACE OF WATER,
Metropolitan Petroleum Petrochemicals Co., Inc., New York. (assignee).
L. G. Green.
U. S. Patent No 3,839, 869, 4 p, 11 fig, 9 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 445, October 8, 1974.

Descriptors: *Patents, *Barriers, *Oil spills, Water pollution sources, Water pollution treatment, Water pollution control, *Pollution abatement, Equipment, *Separation techniques.

The boom is designed to serve as a barrier around or along an area of water to confine oil slicks or any other water surface pollutants against spreading. The boom comprises a number of non-pneumatic floats arranged in spaced alignment and a flexible web wrapped completely around the floats and bridging the spaces between. The side sections of the web beyond the floats are secured together face to face and weights are attached to the web near the marginal edge of these side sections to form a downward extending weighted ballasting fin. The fin forms a hinge connection near the floats to permit the fin to swing about the hinge axis without transmitting its movements to the floats. (Sinha-OEIS)
W75-02147

OFF-SHORE OIL WELL LEAKAGE CONFINER,
M. M. Ryan.
U. S. Patent No 3,839, 870, 4 p, 2 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 927, No 2, p 446, October 8, 1974.

Descriptors: *Patents, *Barriers, *Oil spills, *Oil pollution, Water pollution control, *Pollution abatement, Water quality control, Equipment, Flotation, Pontoons, *Separation techniques.

The apparatus provides positive means for confining the oil on the surface of a body of water that has leaked or escaped from an offshore oil well drilling operation. The invention includes a generally circular wall of continuous construction which may be fabricated on the site by securing a series of plates in edge to edge relationship or the complete wall structure might be lowered around an offshore oil well installation, as by helicopter and secured in position concentrically around the well and anchored to the ocean floor by means including chains. The circular wall structure is floated on the water by means of pontoons encircling the wall and secured to the outside face of the wall. The wall structure extends above and below the surface of the water to act as a positive confining enclosure to retain oil escaping or leaking from around the well casing during the drilling operation or when the well is under productive operation. The circular wall structure may be raised or lowered in the water by controlling the buoyancy of the pontoons, which is accomplished by displacing the air contained in the pontoons with sea water. The buoyancy of the pontoons is regulated through floating valve mechanism located on a platform outside the circular wall whereby a vessel desiring access to the oil well rig may lower the circular wall by making connection with the valve mechanism and pump sea water into the pontoons to displace the air and cause the wall to sink. (Sinha-OEIS)
W75-02148

PROBE FLOATING DEVICE,
Robertshaw Controls Co,. Richmond, Va. (assignee)
For primary bibliographic entry see Field 5D.
W75-02149

WATER PURIFICATION SYSTEM,
Overton Engineering, Billings, Mont. (Assignee).
For primary bibliographic entry see Field 5D.
W75-02156

OUTBREAK OF FOOD POISONING DUE TO ALKYL-MERCURY FUNGICIDE,
Ghana Univ. Medical School, Accra. Dept. of Preventive and Social Medicine.
For primary bibliographic entry see Field 5C.
W75-02194

RECOVERY OF METALLIC IRON FROM FLOTATION TAILINGS BY PNEUMATOLYTIC TRANSPORT-I. REDUCTION BY CARBON MONOXIDE IN FLUIDIZED BED,
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 5D.
W75-02197

RECOVERY OF METALLIC IRON FROM FLOTATION TAILINGS BY PNEUMATOLYTIC TRANSPORT-II. FORMATION OF IRON PENTACARBONYL FROM PARTIALLY REDUCED IRON OXIDE IN FIXED BED,
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 5D.
W75-02198

6. WATER RESOURCES PLANNING

6A. Techniques Of Planning

GENERAL REPORT,
Geological Survey, Reston, Va.
M. E. Moss.
In: Proceedings of International Symposium on Uncertainties in Hydrologic and Water Resource Systems, Vol III, University of Arizona, Tucson, December 11-14, 1972: Arizona University Publication, p 1277-1281, 1972. 4 ref.

Descriptors: *Model studies, *Reviews, *Conferences, Mathematical models, Statistical models, Statistics, Hydrology, Forecasting.

A symposium session entitled 'Model Choice and Verification' is reviewed. The papers are concerned with topics such as (1) what choices are available, (2) what constitutes verification, and (3) how to choose or verify. A majority of the papers in this group basically describe new models and their characteristics so that they may be considered in the model-choice process. (See also W73-14166) (Knapp-USGS)
W75-01651

GENERAL REPORT,
Geological Survey, Fort Collins, Colo.
For primary bibliographic entry see Field 7C.
W75-01652

SELECTION OF AN OPTIMAL IRRIGATION DESIGN, (IN RUSSIAN),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 3F.
W75-01694

INTERREGIONAL PLANNING OF WATER RESOURCES ALLOCATIONS BY SYSTEMS ANALYSIS APPROACH,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 4A.
W75-01801

A RISK MODEL ANALYSIS FOR THE STATE WATER PROJECT,
California Univ., Berkeley. Operations Research Center.
W. A. Ingram.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-231 700, $5.25 in paper copy, $2.25 in microfiche. Technical Report, ORC 74-10, March 1974. 105 p, 5 fig, 14 tab, 10 ref, 7 append. NSF GK-23153 and GP-30961X2.

Descriptors: Water resources, Projects, *Streamflow, *Reservoir operation, *Markov processes, *Risks, Rivers, Water delivery, Water supply, Dynamic programming, Simulation analysis, Powerplants, Optimization, Monthly, State jurisdiction, Computer programs, Deltas, Mathematical models, Systems analysis, California, *Conjunctive use.
Identifiers: *Oroville Reservoir(Calif), *California Aqueduct, Conjunctive operation, Historic flows, Steady state, Storage distribution, *Power generation.

A Markov model based on historical streamflows is presented for use in determining an efficient operation for a single reservoir and generation plant. Consideration is given to maximizing the expected power production capacity of the system while operating at a specified risk level. The model is applied to Oroville Reservoir in Northern California which is used as an example for optimizing the expected on-peak power production of the generation plant while attempting to meet a given release schedule and operational limits placed upon the reservoir. The power production capacity of Oroville is then used in a joint operation with the California Aqueduct to minimize the on-peak power capacity requirements of the combined system. Described is an incremental dynamic programming simulation technique which examines as many set of state variables as possible and chooses the state which yields the smallest total system power. Finally, the extension of the methods presented herein to a multi-reservoir system is discussed. (Bell-Cornell)
W75-01802

MODELS FOR PLANNING AND RESEARCH FOR THE SOUTH FLORIDA ENVIRONMENTAL STUDY,
Florida Univ., Gainesville. Resource Management Systems Program.
A. E. Lugo, S. C. Snedaker, S. Bayley, and H. T. Odum.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-231 938, $5.75 in paper copy, $2.25 in microfiche. Ecological Report No DI-SFEP-74-01, August 1971. 123 p, 33 fig, 5 tab, 227 ref. NPS 14-10-9-900-363.

Descriptors: *Ecosystems, *Florida, *Simulation analysis, *Regions, *Research, *Model studies, Ecology, Behavior, Environment, Human population, Evaluation, Balance of nature, Planning, Freshwater, Saline water, Energy, Coasts, Systems analysis.
Identifiers: Information systems, Energy circuit language, Experimental models.

Presented are qualitative and semi-quantitative models of the south Florida regional ecosystem and several of its many subsystems in order to focus attention on the critical problems and to set research priorities. The energy circuit language is used (as a substitute for differential equations) to identify the major stocks, flows, interactions and feedbacks, control mechanisms and man-nature couplings characteristic of each of the 22 subsystems selected for evaluation. The simulation models include flows of water, energy, carbon, specific chemical elements, dollars and people, i.e., those flows of energy, power and matter linking all subsystems. The systems models diagrammed and discussed in relation to present and needed knowledge include: sawgrass, marsh, man-

grove swamp, wet prairies, pond and slough, pinelands, muckfarms and grazing, canals, urban districts, beaches and sand dunes, several marine and estuarine systems, cypress swamps, hammocks, hydrology, and a regional energy flow model. Recommended is increased understanding of the behavior of whole ecological systems, of which man is one component, and the evaluation of data for this purpose. The whole systems research methodology is described. Given are suggestions for research planning toward optimizing a balance of man and nature in the region which generate the highest economic competitive status. (Bell-Cornell)
W75-01803

APPROACHES FOR DEVELOPING ALTERNATIVES IN PLANNING,
Hydrologic Engineering Center, Davis, Calif.
For primary bibliographic entry see Field 6B.
W75-01805

MEETING REGIONAL WATER REQUIREMENTS--A CASE STUDY,
Illinois State Water Survey, Urbana.
K. P. Singh, A. P. Visocky, and C. G. Lonnquist.
Journal of the American Water Works Association, Vol 66, No 10--Part 1, p 589-600, October 1974. 9 fig, 6 tab, 13 ref.

Descriptors: *Water requirements, *Regional analysis, *Water supply, *Economic efficiency, *Long-term planning, *River basins, Groundwater availability, Surface water availability, Computer programs, Optimization, Human population, Reservoir yield, Water treatment, Hydrologic data, Storage tanks, Equations, Mathematical models, Systems analysis, *Illinois.
Identifiers: *Kaskaskia River Basin(Ill), Water transmission, Raw water production, *Cost minimization.

The availability of ground and surface water sources is assessed and cost optimization is performed to provide an adequate and economical water supply for towns in the Kaskaskia River Basin, Illinois, from 1970 through the year 2020. An analysis of town water requirements and populations yields a stable relation, enabling transformation of population estimates to water requirement estimates for the 50-year period. Three types of water sources are considered: groundwater from drift and shallow bedrock wells; surface water from existing and potential reservoirs; and water from the Kaskaskia River. Cost elements of a water supply system are grouped under costs of raw water production, treatment and transmission to storage tank location. A minimum-cost water supply system is obtained by optimizing the sum of these three costs. Out of 105 towns, only 50 towns in the Basin have adequate groundwater potential to meet the 2020 requirements, groundwater supply is generally more economical than water supply from reservoirs. The study indicates two alternative economical plans for meeting the water requirements of the 105 towns; the plans are described and discussed in terms of adequacy and economic efficiency. (Bell-Cornell)
W75-01807

PUBLIC WORKS CAPACITY EXPANSION BASED ON UNIT COST,
Thompson and Runyan, Inc., Portland, Oreg.
For primary bibliographic entry see Field 6C.
W75-01808

A MODERN METROPOLIS LOOKS AHEAD,
Pitometer Associates, Inc., Chicago, Ill.
For primary bibliographic entry see Field 6B.
W75-01809

FURTHER ANALYSIS OF OPTIMUM SIZE SEAPORT,
Gibb (Alexander) and Partners, London (England).
For primary bibliographic entry see Field 6B.
W75-01810

OPTIMAL DEVELOPMENT OF MULTIPURPOSE HYDRO PROJECTS,
Department of Water and Power, Los Angeles, Calif. System Development Div.
For primary bibliographic entry see Field 4A.
W75-01811

THE EFFECTS OF RECREATION POOL SIZE ON IRRIGATION AND POWER GENERATION AT ELEPHANT BUTTE RESERVOIR,
Texas Tech Univ., Lubbock. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W75-01813

VIRGIN RIVER PROJECT: A REGIONAL APPROACH TO MULTI-OBJECTIVE PLANNING FOR WATER RELATED RESOURCES,
Nevada Univ., Reno. Desert Research Inst.
J. A. Westphal.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-237 858, $3.25 in paper copy, $2.25 in microfiche. Nevada Water Resources Research Center, Reno, November 1974, 6 p. OWRT B-075-NEV(1). 14-31-0001-4167.

Descriptors: *Planning, River basins, Simulation analysis, Model studies, *River basin development, Economics, Environmental effects, Utah, Nevada, Arizona, Water quality, Management, *Regional analysis.
Identifiers: *Virgin River Basin(Utah-Nevada-Arizona), *Multi-objective planning.

Due to increasing awareness for protection of the environment it has become necessary to study the environmental impact of any water resource development program. This study was implemented to round out the evaluation of project impact on the Virgin River Basin with regard to economic growth and environmental quality. Simulation and mathematical programming techniques will be implemented to help develop objective functions for input to the surrogate worth trade-off analysis. Because of the extensive research required to complete this project it has been divided into two separately funded studies. This project is the first part of the research to be completed. To date results are primarily qualitative in nature. A good data base exists in the study area and with the use of a trade-off algorithm analysis desired results will be obtained. The second phase of this project will provide analyses to determine economically and environmentally efficient allocations for a wide range of alternatives. A trade-off method will be tested comparing selected alternative water development projects in the Basin. Once this research project is completed a multi-objective approach will have been formulated and applied to the planning of water and related resources using simulation and mathematical programming techniques. This will provide a means for evaluating commensurate and noncommensurate factors for decision making. (Fallon-Nevada)
W75-01856

BEHAVIORAL INVOLVEMENT IN THE JEFFERSON RESERVOIR ISSUE: A MODEL OF ALTERNATIVE FORMS OF INVOLVEMENT,
Iowa State Univ., Ames. Dept. of Sociology.
V. J. Webb.
Available from the National Technical Information Service, Springfield, Va. 22161, as PB-238 033, $6.25 in paper copy, $2.25 in microfiche. Ph. D Dissertation, 1972. 161 p, 2 fig, 20 tab, 79 ref, 5 append. OWRT B-020-IA(1).

Descriptors: *Behavior, Human population, Decision making, Data collections, Assessments, Model studies, Regression analysis, Surveys, Political aspects, Reservoirs, *Iowa, Attitudes, Social adjustment, *Social participation, Pre-impoundment, Alternate planning.
Identifiers: *Involvement, *Public issues, Guttman scale analysis, Socio-economic status, Democratic value orientation, Voluntary organizations, Sociology, *Jefferson Reservoir(Iowa).

A model of alternative forms of behavioral involvement in public issues is presented and tested. The model is of sufficient scope to encompass both individual and collective involvement forms. Data are reported on a sample of 259 respondents residing in portions of a three-county area near the proposed Jefferson Reservoir. The dependent variable is basically conceptualized in terms of form, or the style of involvement. The Guttman scale analysis was used to assess the relationship between involvement as form and involvement as intensity or the amount of different behaviors directed toward affecting decision making, demonstrating that the independent variable involvement can generally be considered as cumulative in nature. A study objective was to provide a more detailed exploration than before available of the relationship between socioeconomic status and membership in voluntary associations which are an efficient way for individuals to affect larger decision-making structures. A final purpose of the study was to examine the noninvolvement in an issue. Part of the proposed model is concerned with membership in voluntary organizations and represents an extension of existing membership models. It is found that in general, the collective form of involvement represents a greater degree of behavioral intensity than does individual issue involvement. (Bell-Cornell)
W75-01859

6B. Evaluation Process

RULES AND REGULATIONS GOVERNING PUBLIC USE OF WATER RESOURCE DEVELOPMENT PROJECTS ADMINISTERED BY THE CHIEF OF ENGINEERS.
Office of the Chief of Engineers (Army), Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01725

WATER RELATED LAND USE PLANNING GUIDELINES,
Interstate Commission on the Potomac River Basin, Bethesda, Md.
For primary bibliographic entry see Field 4A.
W75-01789

A RISK MODEL ANALYSIS FOR THE STATE WATER PROJECT,
California Univ., Berkeley. Operations Research Center.
For primary bibliographic entry see Field 6A.
W75-01802

APPROACHES FOR DEVELOPING ALTERNATIVES IN PLANNING,
Hydrologic Engineering Center, Davis, Calif.
W. K. Johnson.
Water Resources Bulletin, Vol 10, No 5, p 1017-1022, October 1974.

Descriptors: *Alternative planning, *Decision making, *Methodology, *Water resources development, National income, Regional development, Water pollution control, Mathematical models, Systems analysis.
Identifiers: Planning process, Plan formulation, Environmental quality.

Various approaches which have been used in the past to develop alternative plans for planning studies are discussed, in an attempt to present a survey of existing techniques and encourage planners to consider a broad range of alternative courses of action in their studies. The approaches considered are: rational thought which draws upon the planner's knowledge, experience and judgement; objectives which emphasize specific values such as economic and environmental; technologies which achieve the same objective; public preferences which reflect public values and interests; alternative futures which array a diverse range of possible futures; mathematical models which rapidly evaluate possible alternatives; cost sharing policies which consider a participant's financial interest; Delphi technique utilizing a diversity of professional expertise; the IDEA method which stimulates and evaluates large numbers of alternatives. Most of these approaches have found application on various planning studies. (Bell-Cornell)
W75-01805

MEETING REGIONAL WATER REQUIREMENTS--A CASE STUDY,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 6A.
W75-01807

A MODERN METROPOLIS LOOKS AHEAD,
Pitometer Associates, Inc., Chicago, Ill.
W. D. Hudson.
Transportation Engineering Journal, Proceedings of American Society of Civil Engineers, Vol 100, No TE4, Paper No 10918, p 801-814, November 1974. 10 fig, 2 tab, 5 ref.

Descriptors: *Water supply, Construction, *Long-term planning, Pipelines, *Transportation, *Forecasting, Human population, Water distribution(Applied), Hazen-Williams equation, Hydraulics, Design criteria, Costs, Computer programs, Water demand, Municipal water, Systems analysis, *Texas, *Project planning, *Projections.
Identifiers: Project expansion, *Dallas(Texas), Accuracy of data.

The expansion of the Master Plan for development of the Dallas, Texas, Water Utilities to the year 2000 for the distribution system, and to 2050 for supply, is based on a thorough analysis of past performance data on the system and accurate basic field data. Presented are the details of expansion, based on a very complete computer analysis of all phases of operation from the clearwells and reservoirs to the customers, including best points of entry of new supplies to the distribution system, as well as the required size of new major trunk mains, pump stations, and reservoirs. Extensive analysis was made of methods of operation, economics, and division of costs for supplying the City of Dallas and the suburban communities. The project was unique because of the size of the problem and quantities of water involved. (Bell-Cornell)
W75-01809

FURTHER ANALYSIS OF OPTIMUM SIZE SEAPORT,
Gibb (Alexander) and Partners, London (England).
S. R. C. Wanhill.
Journal of the Waterways Harbors and Coastal Engineering Division, Proceedings of American Society of Civil Engineers, Vol 100, No WW4, Paper No 10961, p 377-383, November 1974. 1 fig, 2 ref.

Descriptors: *Harbors, *Costs, Planning, Ships, Optimization, Economic efficiency, Equations, Simulation analysis, Mathematical models, Systems analysis.
Identifiers: *Berths, *Harbor facilities, *Seaports, *Traffic, Waterways, Newton-Raphson method, Cost minimization.

Total port usage costs in terms of berth provision and total time spent by ships in port is shown to be the relevant criterion for berth planning. Other authors have used a more restrictive criterion dealing with idle berth and idle ship time. The Poisson distribution can be used to simulate the distribution of ships present in the port, but each distribution is specific to the number of berths available. In order that the specified cargo handling rate remains constant, the average number of vessels present for the simulated distribution must be determined simultaneously with the number of berths available. This requires use of an iterative procedure; the Newton-Raphson method is found to be satisfactory. (Bell-Cornell)
W75-01810

OPTIMAL DEVELOPMENT OF MULTIPURPOSE HYDRO PROJECTS,
Department of Water and Power, Los Angeles, Calif. System Development Div.
For primary bibliographic entry see Field 4A.
W75-01811

THE EFFECTS OF RECREATION POOL SIZE ON IRRIGATION AND POWER GENERATION AT ELEPHANT BUTTE RESERVOIR,
Texas Tech Univ., Lubbock. Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W75-01813

U.S. GEOLOGICAL SURVEY ROLE IN PLANNING,
Geological Survey, Reston, Va.
E. L. Hendricks.
In: Water and the Environmental Crunch, Bonini, W. E., editor; Proceedings of Princeton University Conference 115, April 25-27, 1973: Princeton University Conference, Princeton, NJ, p 179-183, May 1974.

Descriptors: *Data collections, *Research and development, *Federal Government, Hydrologic data, Water resources, Environment, Water quality, Water yield, Groundwater, Surface waters.
Identifiers: *US Geological Survey.

The Geological Survey's long history of concern with environmental problems stems basically from scientific competence and ability to perceive resource opportunities in relation to environmental hazards. The USGS has amassed a great range of water-resources data, including data on quantity, quality, and the physical definition of both surface waters and groundwaters. These data have become recognized as fundamental resource information for the planning of water-resources development. As a meaningful frame of reference for monitoring the consequences of man's control and use of water, baseline observations of water in the natural state are needed. The Geological Survey has recognized this need in its network of benchmark hydrologic observation stations. Research in hydrology is directed toward achieving a better understanding of hydrologic systems as they operate in nature so that the continuity and interaction of systems may be delineated and the cause-and-effect relationships completely understood. Predictive models of hydrologic systems include models of streams, estuaries, and groundwater systems. This information and this knowledge are developed in an atmosphere of objectivity and lack of bias. Much of it also is developed in a broad base without reference to specific requirements, so that when a plan or proposal for action is needed some knowledge will be available as the basis for developing and examining alternatives. (Knapp-USGS)
W75-01852

RECREATIONAL REUSE OF MUNICIPAL WASTEWATER,
Texas Tech Univ., Lubbock. Water Resources Center.
For primary bibliographic entry see Field 5D.
W75-01853

VIRGIN RIVER PROJECT: A REGIONAL APPROACH TO MULTI-OBJECTIVE PLANNING FOR WATER RELATED RESOURCES,
Nevada Univ., Reno. Desert Research Inst.
For primary bibliographic entry see Field 6A.
W75-01856

UPDATED WATER AND SEWERAGE PROGRAM.
Greene County Planning Dept., Cairo, N.Y.
For primary bibliographic entry see Field 5D.
W75-01931

WATER QUALITY MANAGEMENT PLAN FOR AIKEN COUNTY, SOUTH CAROLINA, PART I.
South Carolina Administration Div., Columbia. Office of State Planning.
For primary bibliographic entry see Field 5G.
W75-01932

WASTEWATER TREATMENT FOR SMALL COMMUNITIES, PART TWO,
California Univ., Davis. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5D.
W75-01944

WATER PLANNING IN A NO-GROWTH COUNTY,
Kennedy Engineers, Inc., San Francisco, Calif.
W. R. Seeger.
The American City, Vol 89, No 6, June 1974. p 54-55.

Descriptors: *Water management(Applied), *Planning, *Optimum development plans, *Water policy, Alternate planning, Conservation area redevelopment, Project purposes, Projects, *California, Water users.
Identifiers: *Marin County(Calif).

After defeat of a bond issue, Marin County, California, discovered that people of the community wanted more sophisticated policies than just plenty of water at low cost. A proposed major water project to increase supply for an estimated increase in population provoked the public to challenge both the need for the project and the population statistics. Although opinion ranged from no-growth to unlimited, town meetings resulted in abandoning the project and reassessing water resource goals to reflect a prevailing no-growth philosophy. Water district manager embarked on an intensive water conservation program which included a public information program for citizen involvement and a revision of the rate schedule to reflect 'true' consumption, which led to reduction in total water use by large customers. Moratorium on extension of the water supply led to numerous legal suits. Guidelines established for utilities to better serve the public are: (1) don't promote, only present, a project; let the public make the decisions; (2) work closely with all planning boards to determine community desires on future growth; (3) plan project to meet desired populaton and growth factors; (4) involve community; (5) encourage town meetings to present facts, respect input from meetings; (6) challenge silent community to achieve total involvement; (7) after gathering facts, hold a general seminar to congeal various thoughts and ideas. (Salzman-North Carolina)
W75-01949

DRINKING WATER GOOD, BUT NOT PERFECT,
For primary bibliographic entry see Field 5G.
W75-01950

SHORELINE DEVELOPMENT: POLICY ISSUES IN NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand).
T. W. Fookes.
Royal Australian Planning Institute Journal, Vol 12, No 3 and 4, p 90-92, July-October, 1974. 4 ref.

Descriptors: *Shores protection, *Planning, *Regional development, *Recreation facilities, Lakeshores, Seashores, Coasts, Shores, Political aspects, Governments, Social values.
Identifiers: *New Zealand.

New Zealand has recently experienced an increase in national awareness of the need for conservation of coastal and lakeshore environments. Together with considerable pressure from land developers for shoreline sites, this has stimulated a government study of major policy issues facing coastal development. The issues under notice, and the resources available for ensuring that they are adequately considered, are summarised and discussed. A significant change in government attitudes is revealed by a recognition that value judgements are a necessary part of development planning. (CSIRO)
W75-02168

URBAN STORMWATER DRAINAGE PLANNING AND ENVIRONMENTAL DESIGN,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
For primary bibliographic entry see Field 4A.
W75-02170

THE ULTIMATE WATER RESOURCES DEVELOPMENT OF THE UPPER CONDAMINE RIVER BASIN,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 6D.
W75-02184

THE IMPACT OF URBAN WATER USE ON THE RURAL COMMUNITY,
Gutteridge, Haskins and Davey Pty Ltd., Brisbane (Australia).
For primary bibliographic entry see Field 6D.
W75-02188

RECREATIONAL USE OF INLAND WATER FACILITIES,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
H. S. Ross.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia Report No 41, p 6.1-6.13, September 1974. 1 fig, 2 tab, 2 ref.

Descriptors: *Reservoirs, *Recreation facilities, Recreation demand, Reservoir operation, Project planning, Surveys, Social aspects, *Australia.
Identifiers: *Queensland(Aust).

While the prime duty of the government in relation to water resources development is to provide an adequate quantity of safe and suitable water for the project associated with a storage, there is also a certain obligation to assist in providing recreational facilities at major storages. The development, control, and utilization of such facilities at thirteen storages in Queensland is described and discussed. (CSIRO)
W75-02189

6C. Cost Allocation, Cost Sharing, Pricing/Repayment

STANDARDS AND EFFLUENT CHARGES FOR POLLUTION ABATEMENT,
Florida Southern Coll., Lakeland.
For primary bibliographic entry see Field 5G.
W75-01716

USE HIGHWAY FUNDS TO TREAT STREET RUNOFF,
Metropolitan Sanitary District of Greater Chicago, Ill.
For primary bibliographic entry see Field 5D.
W75-01737

EFFLUENT CHARGES, TOWARDS A NEW ENVIRONMENT,
For primary bibliographic entry see Field 5G.
W75-01784

PUBLIC WORKS CAPACITY EXPANSION BASED ON UNIT COST,
Thompson and Runyan, Inc., Portland, Oreg.
C. Harrison.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 100, No HYll, Paper No 10955, p 1707-1715, November 1974. 1 fig, 4 tab, 13 ref.

Descriptors: *Public utilities, *Water resources, *Design, *Financing, *Projects, Amortization, Economic efficiency, Economies of scale, Computer programs, Methodology, Systems analysis, Equations, Planning.
Identifiers: *Capacity expansion, *Unit cost approach, Economic analysis, *Cost minimization, Population growth, Bonds.

In the public works field, the ultimate judge of a product or service is the customer; he is interested in the unit cost to him, not the total or present-worth cost of a total project. A procedure is presented for determining the capacity design time that results in the lowest unit cost to the user of a public works facility or project. The capacity expansion period, which results in the lowest present worth of future unit costs, is found by using a patterned search technique based on Fibonacci numbers. Resulting least-cost capacity expansion periods are found to be independent of the demand growth constant, but somewhat dependent on the population growth constant. It is found that the higher the rate of population growth in the utility service area, the shorter the appropriate capacity design time. The use of a unit cost approach to determine the most economical capacity expansion time for a public works project financed by bonds results in a shorter capacity expansion period than does the total cost approach. The period over which bonds used to finance the project were amortized is found to have a substantial influence on the unit cost to the customer. In areas of substantial population growth, long bond amortization periods can substantially reduce the total costs to any one consumer. The procedure is applicable only to the design of public works projects financed by the sale of long-term bonds. (Bell-Cornell)
W75-01808

A SIMPLE METHOD FOR INVESTIGATION OF THE BIODEGRADABILITY OF PRODUCTS AND CONSTITUENTS IN WASTEWATER (EIN EINFACHES VERFAHREN ZUR PRUFUNG DER BIOLOGISCHEN ABBAUBARKEIT VON PRODUKTEN UND ABWASSERINHALTSSTOFFEN),
Farbwerke Hoechst AG, Frankfurt am Main (West Germany).
For primary bibliographic entry see Field 5B.
W75-01873

COST OF THERMAL EFFLUENT STANDARDS FOR POWER PLANTS,
Stanford Univ., Calif. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5G.
W75-01878

THE LONG-RUN ASYMMETRY OF SUBSIDIES AND TAXES AS ANTIPOLLUTION POLICIES,
Michigan Univ., Ann Arbor. Dept. of Economics.
For primary bibliographic entry see Field 5G.
W75-01904

COSTS OF DISSOLVED AIR FLOTATION THICKENING OF WASTE ACTIVATED SLUDGE AT MUNICIPAL SEWAGE TREATMENT PLANTS,
National Environmental Research Center, Cincinnati, Ohio. Advanced Waste Treatment Research Lab.
For primary bibliographic entry see Field 5D.
W75-01911

6D. Water Demand

A SOUND WATER PLAN FOR SOUTH FLORIDA: IMPLEMENTATION OF THE 1972 WATER RESOURCES ACT,
Spessard L. Holland Law Center, Gainesville, Fla.
For primary bibliographic entry see Field 6E.
W75-01706

INTERREGIONAL PLANNING OF WATER RESOURCES ALLOCATIONS BY SYSTEMS ANALYSIS APPROACH,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 4A.
W75-01801

RIVER INDUS RECHARGE AND REGENERATION,
MacDonald (Murdoch) and Partners, London (England).
For primary bibliographic entry see Field 4B.
W75-01806

WATER FACILITIES PLANNING ANALYSIS FOR THE CITY OF JACKSON, MISSISSIPPI.
Engineering Associates, Inc., Jackson, Miss.
For primary bibliographic entry see Field 3D.
W75-01929

DESIGN GUIDELINES FOR DISTRIBUTION SYSTEMS AS DEVELOPED AND USED BY AN INVESTOR-OWNED UTILITY,
California Water Service Co., San Jose.
J. A. Wade.
Journal of the American Water Works Association, Vol 66, No 6, p 346-348, June, 1974.

Descriptors: Management, *Water policy, *Water distribution, *Water delivery, *Water works, *California, Legal aspects, Management, Water supply, Water supply development, Water demand, Water users, Water rights, Jurisdiction, Regulation, Water utilization, Water shortage, Dependable supply, Water sources, Water costs, Water control, Water law, Planning.
Identifiers: California Water Service Co, California Public Utilities Commission, *Investor-owned water utility, Water use, Water system.

An investor-owned water utility, the California Water Service Company, is a multiunit utility providing domestic water service to 275,000 accounts in 35 California communities. It consists of 22 separate, integrated water systems, or districts, most of which are located in the central valley of California. It is a stock company with shares traded in the over-the-counter market. However, the company is regulated by the California Public Utilities Commission, which stipulates rules for operation, service areas, and rates. By these rules, each of the 22 districts must be treated separately for rate-making purposes, based upon the capital invested in each system. Construction budgets are prepared three years in advance as part of this rate process, and estimates must be sufficiently

detailed to meet management objectives and withstand examination by the Public Utilities Commission. With California's large population increase, local sources of supply are becoming inadequate, so agencies such as this one are turning to regional governmental agencies to augment the water supply. Experience has shown that investor-owned water utilities do have a viable purpose, but it is necessary to have a clear conviction of public service. (Grden-North Carolina)
W75-01954

CONTINUOUS WATER QUALITY MONITORING,
Clyde River Purification Board, Glasgow (Scotland).
For primary bibliographic entry see Field 5B.
W75-01955

MAP SHOWING AREAS SERVICED BY PUBLIC WATER-SUPPLY AGENCIES IN 1973, GREATER PITTSBURGH REGION, SOUTHWESTERN PA.,
Geological Survey, Pittsburgh, Pa.
For primary bibliographic entry see Field 7C.
W75-02137

THE ULTIMATE WATER RESOURCES DEVELOPMENT OF THE UPPER CONDAMINE RIVER BASIN,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
F. B. Haigh.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia, Report No 41, p 1.1-1.16, September 1974.

Descriptors: *Water resources development, *Potential water supply, *Projections, *Australia, Groundwater resources, Regional development, Water requirements, Water resources, Planning, Artificial recharge, Reservoirs, Water demand.
Identifiers: *Condamine River(Qld), Murray Basin.

The Condamine-Balonne River basin in southern Queensland is the most important of the four river systems which cross the Queesland-New South Wales Border. The surface and groundwater resources in the upper reaches of the system are summarised, together with the extent of present and proposed development. It is emphasised that proposals must be based on years of low flow, and take account of requirements downstream; fulfillment of present commitments depend upon the development of groundwater resources in addition to surface runoff, and upon the solution of some problems in artificial recharge. It is concluded that the upper limit of water resources development for rural use in the area has virtually been reached. (CSIRO)
W75-02184

THE IMPACT OF URBAN WATER USE ON THE RURAL COMMUNITY,
Gutteridge, Haskins and Davey Pty Ltd., Brisbane (Australia).
J. F. Keays.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia Report No 41, p 5.1-5.5, September 1974.

Descriptors: *Water allocation(Policy), *Urbanization, Water demand, Social aspects, Rural areas, Regional development.

Careful planning is necessary to balance the water demands of urban and rural populations in areas of limited water supply with rapid urban growth. The rural community, in particular, must take care that its needs are not neglected in the face of political recognition of urban pressures. (CSIRO)
W75-02188

RECREATIONAL USE OF INLAND WATER FACILITIES,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 6B.
W75-02189

6E. Water Law and Institutions

ECONOMIC AND LEGAL ASPECTS,
Battelle Columbus Labs., Ohio.
For primary bibliographic entry see Field 5B.
W75-01698

LAW AND TRACE METALS,
Ohio State Univ., Columbus.
For primary bibliographic entry see Field 5B.
W75-01700

PROPOSED REGULATIONS FOR THE DISPOSAL OF WASTEWATER IN SUBDIVISION.
Missouri Clean Water Commission, Jefferson City.
For primary bibliographic entry see Field 5G.
W75-01701

BIBLIOGRAPHY ON THE 160-ACRE ANTI-MONOPOLY WATER LAW,
C. L. Smith.
Available from C. L. Smith, 61 San Mateo Rd., Berkeley, California 94707, $1.00 per copy. (January, 1974). 12 p, 302 ref.

Descriptors: *Reclamation, *Land reclamation, *Water utilization, *Irrigation, *Water supply, Federal Reclamation Law, Reclamation states, Government finance, Planning, Aqueducts, California, Dams, Watershed management, Water management(Applied), Water yield, Water sources, Water rights, Water law, Legal aspects, Water resources development, Government supports.
Identifiers: *National Reclamation Act.

Congress passed the National Reclamation Act of 1902 to help water development in the West by federal subsidies. These subsidies to privately owned lands now run from $1,000 to $2,000 per acre, according to the Bureau of the Budget. In order to prevent monopoly of water, subsidies and unearned increment, Congress included provisions in the National Reclamation Act to limit the benefits any individual may legally receive. These protections against monopoly of the government-supplied water are sometimes called 'excess land law', 'acreage limitation' or '160 acre law'. The limitation insures that this enormous expenditure will not go in disproportionate shares to a few individuals with large land holdings. Moreover, it prevents the use of the federal reclamation service for speculative purposes. This bibliography lists government documents, relevant portions of the Congressional Record, miscellaneous books, articles and reports, as well as organizations and publications related to the '160 acre law'. (Ritchie-Florida)
W75-01702

HARRELL V. HESS OIL AND CHEMICAL CORP. (CLASS ACTION TO RECOVER DAMAGES FOR POLLUTION OF CREEK).
287 So. 2d 291 (Fla. 1974).

Descriptors: *Judicial decisions, *Water pollution, *Water pollution sources, *Riparian rights, *Natural flow doctrine, Legal aspects, Common law, Legal review, Riparian land, Riparian waters, Water law, Water rights, Laws, Navigable waters, Damages, Legislation.

Property owners brought a class action on behalf of all owners of property bordering a navigable creek and all persons who had used the creek since its alleged pollution, seeking to recover damage resulting from the alleged pollution by the defendant corporations. The Supreme Court of Florida held that plaintiffs had failed to properly plead a class action, but had stated an individual cause of action by way of the following assertions: plaintiffs had suffered specific items of damages proximately caused by the defendant's violation of state and federal statutes; and plaintiffs' riparian rights had been adversely affected by defendant's actions. (Hunter-Florida)
W75-01703

THE STOCKHOLM CONFERENCE: SOME IMPLICATIONS FOR THE LAW OF THE SEA,
A. R. Wike.
In: Sea Grant Publication UNC-SG-74-03, p 11-17, March, 1974. 45 ref.

Descriptors: *International law, *Law of the sea, *Oceans, *Water pollution, *Conferences, *Environment, Environmental effects, Water pollution sources, Water pollution control, International waters, Pollution abatement, Legal aspects, Social aspects, Governments, United Nations, Pollutants, Monitoring, Data transmission, Waste disposal, Treaties, Standards.

Global environmental demands require new concepts of sovereignty, new codes of international law, new international means of managing the oceans, and new ways of financing continued international collaboration. The scope of proposals considered at the Stockholm Conference in 1972 far exceeded that of existing international law. The conference lead to the signing of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. The other major document produced by the Stockholm Conference is the United Nations Declaration on the Human Environment. Although non-legalistic in tone, it is thought to represent the foundation for a new body of international law, outlining standards which will some day be cited against 'environmental aggression'. The Declaration is followed by an Action Plan consisting of numerous recommendations relating to marine pollution. A key part of the Action Plan is the proposal for a global environmental monitoring system--Earthwatch--to provide advance warning of deleterious effects to human health from man-made pollutants. (Ritchie-Florida)
W75-01704

THE RIGHT OF INNOCENT PASSAGE IN INTERNATIONAL STRAITS,
G. L. Murphy.
In: Sea Grant Publication UNC-SG-74-03, p 42-49, March, 1974. 28 ref.

Descriptors: *International law, *International waters, *Law of the sea, *Legal aspects, *Jurisdiction, Treaties, Foreign waters, Coasts, United States, United Nations, Oceans, Straits, Navigation, Navigable waters, Foreign trade, Commercial fishing, Transportation, Continental shelf, Conferences.

Despite the codification of efforts made at the 1958 Geneva Conference on the law of the sea, uncertainties and difficulties concerning the nature of innocent passage continue. The Unites States position for the recently scheduled 1974 Conference is that the effect of these uncertainties would be greatly amplified were they to accompany an extension of the territorial sea into areas of international straits traditionally regarded as high seas. The United States is now willing to agree to an extension of the territorial sea to a twelve-mile limit, but this agreement must be coupled with an agreement on the free transit of straits used for international navigation. Recognizing in the 1960's that the three-mile limit was no longer a

meaningful principle of international law, the United States began negotiating for a position whereby freedom of the seas would be preserved as much as possible. An historical background of the problems involving freedom of the seas, and the results of the 1958 Geneva Convention are described. The shift in the United States position and the preparations for the 1974 Convention are outlined. (Ritchie-Florida)
W75-01705

A SOUND WATER PLAN FOR SOUTH FLORIDA: IMPLEMENTATION OF THE 1972 WATER RESOURCES ACT,
Spessard L. Holland Law Center, Gainesville, Fla.
F. E. Maloney.
Florida Environment and Urban Issues, Vol 1, No 4, p 1-4, March 1974.

Descriptors: *Florida, *Water supply, *Water requirements, *Water allocation(Policy), *Water resources, Planning, Water table, Water sources, Groundwater recharge, Human population, Natural resources, Recreation, Wildlife conservation, Industrial use, Agricultural use, Evaporation, Consumptive use, Water demand, Water distribution(Applied), Natural recharge, Water levels, Water yield, Water conservation, Droughts.

South Floridans are worrying about the adequacy of future water supplies in light of continuing population growth. Advances in industry and agriculture have led to increasing demands on this limited natural resource. Water for crops and livestock is needed at times of lowest streamflow. Urbanization will put a severe strain on the area's water resources. The water-holding capacity of land is reduced when rural land becomes urban. Paved surfaces retain heat, increase evaporation, and reduce recharge areas for replenishment of ground water resources. As demand for water for consumptive use has been increasing, the interests of ecologists and recreation users in maintaining streamflows and surface and ground water levels has assumed greater importance in the minds of the public. What is needed is the development of a sound long-range water plan for South Florida. Another problem is the protection of the wildlife in the Everglades which depends on its watery environment for survival. (Sperling-Florida)
W75-01706

WATER POLLUTION.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01707

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA.
California State Water Resources Control Board, Sacramento.
Regulations and Information Pertaining to Appropriation of Water in California, p 61-69, (December 1973).

Descriptors: *California, *Court decisions, *Water law, *Riparian rights, Natural use, Prior appropriation, Natural flow doctrine, Legislation, Legal aspects, Competing uses, Ownership of beds, Appropriative rights, Adjudication procedure, Beneficial use, Permits, Administrative agencies, Water allocation, Priorities, Reasonable use, Water sources, Unappropriated water, Relative rights, Riparian lands, Water users.
Identifiers: Water rights(Non-riparian).

Prior to 1872 appropriative water rights in California could be acquired by taking and beneficially using water. Once acquired, an appropriative right could only be maintained by continuous beneficial use of water. After 1914, the date of the Water Commission Act, the process for acquiring such rights changed dramatically. Riparian rights in California are the same as those at common law except as modified by judicial decisions. Lands which border on a natural watercourse are riparian. Each riparian has a correlative right to share in the reasonable beneficial use of the natural flow of water and no permit is required for such a use. A between riparians, priority of use creates no priority of right. The right is not lost by non-use and is subject to the doctrine of reasonable use. Described are rights gotten by prescription. The right to use water is a property right and disputes as to that right should be settled by court action. Methods of appropriating ground and spring water are discussed along with ownership rights in that water. (Sperling-Florida)
W75-01708

THE HOUSTON CHANNEL, HOW CLEAN IS CLEAN.
For primary bibliographic entry see Field 5G.
W75-01709

LAW BOOKS RECOMMENDED FOR LIBRARIES, NO 38, WATER LAW, SUPPLEMENT.
Association of American Law Schools, Washington, D.C.
Fred B. Rothman and Co, South Hackensack, New Jersey 1974. 12 p.

Descriptors: *Publications, *Water law, *Bibliographies, *Universities, *Libraries, Education, Documentation, Abstracts, Research facilities, Information retrieval, Reviews, Translations, Classification.

This publication is a supplement to the original Water Law list and also follows list scope. The types of collections are referred to by 'A', 'B', and 'C.' 'A' indicates that the title is recommended for inclusion in the basic minimum collection. 'B' indicates that the title is recommended for a library which is in the intermediate phase of development and is progressing toward support of a research program and an enriched curriculum which includes seminar offerings. 'C' indicates that the title is recommended for larger libraries with research collections of such quality and scope that they will support original scholarship in considerable depth. The supplement is broken down into seven categories. These include bibliographies, periodicals, general treatises, legal treatises, state legal treatises, other common law jurisdictions and pollution. For each publication, a brief description of its content is set forth. An index of authors is included. (Sutton-Florida)
W75-01710

A REPORT TO: THE PRESIDENT AND THE CONGRESS, BY THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, FIRST ANNUAL REPORT.
National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Price $0.40. June 30, 1972. 44 p.

Descriptors: *Oceans, *Atmosphere, *Management, *International law, *Political aspects, *Institutional constraints, Weather modification, Coastal areas, Project planning, Technology, Environmental sanitation, Jurisdiction, Fish conservation, Commercial fish, Legal aspects, Conservation, Fish farming, Law of the sea, Harvest, Regulation, Natural resources, Competing uses, Water quality control, Weather, International waters, Air pollution.
Identifiers: *Coastal waters, *Hazardous substances(Pollution), *Coastal zone management.

Effective resource management of the oceans and the atmosphere requires agreement among the parties whose interests are involved. The interdependence of nations clearly complicates the situation. International politics has taken over where technological interchange would better serve all concerned. The developing controversies over freedom of passage, freedom for research, and the jurisdiction of fisheries are reviewed. The growing international awareness that fish can be harvested to extinction if not biologically managed is noted. The ability to modify the weather both intentionally and inadvertently is discussed. The development of appropriate regulation is advocated. Extreme management efforts are needed to rationalize the conflicting and competing uses of coastal zones. It is on the means for promoting a more effective interaction between management and science that the discussion of the coastal zone centers. The oceans and atmosphere belong to all and it is in the common interest to enhance the use and decrease the abuse to which they are subjected. (Sperling-Florida)
W75-01711

PRESIDENT'S SLASH OF CLEAN-WATER FUNDS MAY SHIFT DEBATE FROM CONGRESS TO THE COURTS, (PART I),
R. Corrigan.
National Journal, Vol 4, p 1846-1855, Dec 2, 1972. 7 photo, 2 tab.

Descriptors: *Legislation, *Political aspects, *Water quality control, *Waste water treatment, Federal government, Waste water discharge, Environmental effects, Municipal wastes, Treatment facilities, Sewage effluents, Economic aspects, Budget, Funding, Government finance, Navigable waters, Standards, Effluents, Secondary treatment.
Identifiers: Federal Water Pollution Control Act Amendments of 1972.

Discussed is President Nixon's veto of a twenty five billion dollar water pollution control bill. The legislation was the Federal Water Pollution Control Act Amendments of 1972, and Nixon's veto was overridden by a lopsided majority. The bill established a national goal that the discharge of pollutants into the navigable waters be eliminated by 1985. Twenty-one million dollars of the appropriation would pay for construction of public sewage treatment plants and related facilities. Eighteen million dollars would be dispersed through federal contracts. Most state officials agree that without the full authorization, the goals of the legislation will not be met. An administrative official said the deadline for municipal waste cannot be met under any circumstances, at any level of funding. All sewage treatment plants are required to meet effluent limitations based upon secondary treatment of sewage. The intent of Congress is that the federal government requires that all sewage plants to meet the secondary treatment requirement by 1978 at the latest. The administration viewpoint was allegedly stated merely as a prelude to the restriction of funds. (Sperling-Florida)
W75-01712

MEMORANDUM OF AGREEMENT (EPA-OREGON DEPT. OF ENVIRONMENTAL QUALITY COOPERATION IN PREPARATION AND ISSUANCE OF MUNICIPAL AND INDUSTRIAL WASTE DISCHARGE PERMIT).
Journal Water Pollution Control Federation, Vol 44, No 12, p 2398-2400, December 1972. 4 p, 1 fig.

Descriptors: *Regulation, *Permits, *Administrative agencies, *Waste-water disposal, Federal government, Government finance, Budget, Treatment facilities, Oregon, Industrial wastes, Cooperatives, State governments, Programs, Monitoring, Adoption of practices.
Identifiers: *Administrative regulations.

The regional administrator of the EPA and the Director of the State of Oregon Department of Environmental Quality have entered into an agreement for operation of a cooperative state-federal waste-discharge permit program. They will also

establish policies and procedures for issuance of municipal and industrial waste discharge permits in the state of Oregon. Policies and procedures are set out dealing with permit preparation, conditions, review, and follow-up inspections and monitoring procedures. (Sperling-Florida)
W75-01713

UNITED STATES V. RESERVE MINING CO. (DISCHARGE OF REFUSE INTO NAVIGABLE WATERS).
1 Pollution Control Guide, Vol 3, paragraph 15062, p 15465-15470, May 13, 1974. 1 ref.

Descriptors: *Federal Water Pollution Control Act, *Public health, *Water pollution, *Air pollution, *Judicial decisions, Navigable waters, Pollutants, Lake Superior, Wisconsin, Michigan, Minnesota, Interstate, Water quality standards, Asbestos, Federal government, Regulation, Penalties(Legal), Abatement, Disposal, Permits, Potable water, Common law, Water supply, Jurisdiction, Administrative agencies, Water resources development, Adoption of practices, Adjudication procedure, Enforcement, Administration.
Identifiers: *Injunctive relief, *Refuse Act of 1899, *Administrative regulations, *Environmental policy, *Hazardous substances(Pollution).

Plaintiff United States brought action for injunctive relief against defendant mining company alleging violations of the Federal Water Pollution Control Act, the creation of a common law nuisance, and a serious health hazard from the unlawful discharging of taconite tailings into Lake Superior and into the ambient air. The facts were not disputed. Defendant contended that it had discharge permits which sanctioned its actions but the District Court disagreed. Defendant also reminded the court that a discharge curtailment would result in a severe economic blow to the local population, who depend on defendant for employment. The court agreed and asked defendant for an alternate disposal plan. Defendant claimed that its only plan was economically not feasible. Plaintiff, however, offered a plan that was both economically feasible and which would satisfy the health and environmental considerations raised. Defendant declined to abate the discharges under plaintiff's plan and submitted a counterproposal which the court was unwilling to accept. Thereupon, the court ordered an immediate halt to the discharges until defendant complied with the prescribed regulations. (Chennault-Florida)
W75-01714

SCENIC HUDSON PRESERVATION CONFERENCE, ET AL. V. CALLAWAY (CHALLENGE TO CONSTRUCTION OF HYDROELECTRIC FACILITY).
1 Pollution Control Guide, Vol 3, paragraph 15032, p 15267-15274, 1974.

Descriptors: *Dredging, *Judicial decisions, *Federal Water Pollution Control Act, *Legislation, *Permits, Waste water discharge, Rivers and Harbors Act, Federal Power Act, Planning, Legal aspects, Hydroelectric project licensing, Hydroelectric plants, Construction, Adoption of practices, Water law, Water quality control, Environmental sanitation, Navigable waters, Environmental effects, Interagency cooperation.
Identifiers: *Navigational obstructions, *Licenses.

This is a suit to compel procurement of a permit prior to discharge. A discharge permit is required from the United States Army Corps of Engineers pursuant to the Federal Water Pollution Control Act prior to the discharge of dredged or fill materials into navigable waters. The provisions of the Federal Power Act give the Federal Power Commission exclusive authority over the licensing of hydroelectric power generating facilities, and exempt the recipient of a license for construction and operation from compliance with the permit requirements of the Rivers and Harbors Act. However, the Federal Power Act doesn't prevent the Corps of Engineers from exercising its discharge permit authority under the Federal Water Pollution Control Act. Consequently, the court held where the construction of a licensed hydroelectric power facility involves the excavation and discharge of dredged or fill materials into navigable waters, a permit that authorizes such a discharge must be sought from the Corps of Engineers. (Sperling-Florida)
W75-01715

THE NORTH SEA CONTINENTAL SHELF CASES: A POSTSCRIPT,
Syracuse Univ., N.Y. Coll. of Law.
L. F. E. Goldie.
New York Law Forum, Vol 18, No 2, p 411-434, Fall 1972. 38 ref, 2 append.

Descriptors: *International law, *Continental shelf, *Boundary disputes, *Legal aspects, *Judicial decisions, Coasts, Marine geology, Water law, Law of the sea, Foreign waters, International waters, Adoption of practices, Regulation, Treaties, Governments, Oceans, Continental margin, Negotiations, Equitable apportionment, Geological survey, Natural resources, Investigations, Geologic formations.
Identifiers: *Coastal zone management, *Coastal waters.

The International Court of Justice resolved differences between the Netherlands and Denmark with Germany in the North Sea Continental Shelf cases. The court in that decision broke new ground in international law by formulating an analogy to the obligation of good faith bargaining in American domestic labor law. The court devised equitable rules to govern the obligation to bargain in good faith. One such rule or principle was that the parties must enter into negotiation with a view to arriving at an agreement. That is, each side must contemplate some modification of its position. In regard to the disputed boundaries of adjacent continental shelf areas, the equidistance method or other methods can be used. The continental shelf of any state must be the natural prolongation of its land territory and must not encroach on the territory of another state. In the course of negotiations, factors to be taken into account include the general configuration of the coasts as well as the presence of any special or unusual features, the physical and geological structures, and natural resources of the shelf areas. (Sperling-Florida)
W75-01717

SOME BASIC ISSUES IN WATER POLLUTION CONTROL LEGISLATION,
Queensland Univ., Brisbane (Australia).
For primary bibliographic entry see Field 5G.
W75-01718

APPRAISAL OF RIPARIAN RIGHTS,
Cunningham and Rivard Appraisals Ltd., Vancouver (British Columbia).
F. M. Cunningham.
The Appraisal Journal, Vol 41, p 180-201, April 1973.

Descriptors: *Water law, *Riparian rights, *Legal aspects, *Appraisals, *Ownership of beds, Beds, Water rights, Dams, Natural flow doctrine, Navigable waters, Obstruction to flow, Reasonable use, Riparian land, Riparian waters, Condemnation, Condemnation value, Water quality, Embankments, Accretion(Legal aspects), Boundaries(Property).

Riparian rights can be defined as rights at common law, appurtenant to lands fronting on water. A riparian owner is entitled to certain rights in or upon the water in front of his land even where the land covered by water is vested in someone else. These rights exist whether the water is a navigable river, whether tidal or otherwise, or is a portion of the ocean itself. The rights of riparians include the right to have the water in its natural condition in front of his land undiminished in quantity and unimpaired in quality, ownership of submerged lands to the middle of the covering water, the right to construct dikes and protective embankments, the right to construct a wharf or pier, the right of access and the right of accretion. It is incumbent upon appraisers to have a thorough understanding of riparian rights before attempting to appraise them. While valuation can be done on an income approach involving the capitalization of income, or the cost approach, the most important approach to value is the comparative approach. This permits a direct comparison to similar submerged lands. (Ritchie-Florida)
W75-01719

PLAIN TALK ABOUT FLOOD PLAINS,
Minnesota Dept. of Natural Resources, St. Paul. Div. of Waters, Soils and Minerals.
For primary bibliographic entry see Field 6F.
W75-01720

WATER QUALITY STANDARDS--ADOPTION, IDENTIFICATION, AND AVAILABILITY OF STATE STANDARDS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01721

AREAWIDE WASTE TREATMENT PLANNING AREAS AND RESPONSIBLE AGENCIES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01722

LIABILITY LIMITS FOR SMALL ONSHORE STORAGE FACILITIES--FINANCIAL LIABILITY OF SMALL FACILITIES.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 177, p 25439-25440, September 13, 1973.

Descriptors: *Regulation, *Federal Water Pollution Control Act, *Adoption of practices, *Storage tanks, *Oil, Government finance, Economic aspects, Administrative agencies, Administration, State government, Water quality control, Environmental sanitation, Oil industry, Oil wastes, Cost transfer, Decision-making, Project planning, Cost allocation, Data collections.
Identifiers: *Administrative regulations, *Hazardous substances(Pollution).

These regulations, issued by the Environmental Protection Agency, establish limits on the financial liability of small facilities for the costs of oil removal. Comments on the proposed rules were received from Michigan and Rhode Island. The comments alleged that there would be a detrimental effect on state oil pollution control programs by limiting financial liability for oil spill removal. They also suggested the impropriety of expending public funds for removal of oil spills when costs exceed those specified by the proposed regulation. However, the costs of cleanup associated with discharges from small onshore storage facilities have not exceeded the limits specified in the regulation. As additional cost data become available, the regulation may be amended. These regulations issued pursuant to the Federal Water Pollution Control Act apply to oil storage facilities with a fixed capacity of one thousand barrels or less. There is a maximum liability of eight million dollars. Such small facilities do not present a substantial risk of environmental damage as do larger facilities. (Sperling-Florida)
W75-01723

RULES AND REGULATIONS GOVERNING PUBLIC USE OF WATER RESOURCE DEVELOPMENT PROJECTS ADMINISTERED BY THE CHIEF OF ENGINEERS.
Office of the Chief of Engineers (Army), Washington, D.C.
Federal Register, Vol 38, No 56, p 7552-7554, March 23, 1973.

Descriptors: *Recreation, *Recreation facilities, *Reservoir operation, *Regulation, *Water resources development, Camping, Hunting, Fishing, Water sports, Water skiing, Lakes, Reasonable use, Safety, Tourism, Parks, Legal aspects, Legislation, Resources development, Water management(Applied), Water policy, Federal project policy.

The Secretary of the Army issued Part 327, Title 36 of the Code of Federal Regulations (CFR), which supercedes Parts 311 and 326. Part 327 sets forth rules and regulations governing public use of water resource development projects administered by the Chief of Engineers. Increased public use of these projects and changing patterns of recreation activity necessitated the change in rules. The policy is to provide the public with safe and healthful recreational opportunities. Motor vehicles, including off-road vehicles, are prohibited except where designated by the District Engineer. Vessels may not be operated for profit without a license, nor may vessels go in prohibited areas. Aircraft may not be operated, except in extreme emergency, without the permission of the District Engineer. The District Engineer is given authority to establish a reasonable schedule for visiting project areas. His control also extends to supervision of almost all forms of outdoor recreation, including swimming, picnicking, camping, hunting, sanitation, fires, pets, fireworks, firearms, and explosives. Destruction of public property is prohibited and procedures are included for disposing of abandoned personal property. The District Engineer controls commercial activity and issues permits for construction of structures and for special events such as water carnivals. (Craig-Florida)
W75-01725

OCEAN DUMPING--CRITERIA.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01726

MARINE SANITATION DEVICES--PROPOSED RULES.
Coast Guard, Washington, D.C.
For primary bibliographic entry see Field 5D.
W75-01727

COASTAL ZONE MANAGEMENT PROGRAM DEVELOPMENT GRANTS--PROPOSED RULES.
National Oceanic and Atmospheric Administration, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01728

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM--PROPOSED RULES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01729

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM--PROPOSED RULES AND REGULATIONS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5G.
W75-01730

NOTICE OF RESERVATION OF WATERS FOR USE ON FEDERALLY OWNED LANDS IN ARIZONA AND CALIFORNIA--COLORADO RIVER.
Bureau of Land Management, Washington, D.C.
Federal Register, Vol 38, No 173, p 24389-24390, September 7, 1973.

Descriptors: *Colorado River, *Arizona, *California, *United States, *Water allocation(Policy), *Boulder Canyon Project Act, Colorado River Basin, Colorado River Compact, Water distribution(Applied), Riparian rights, Federal government, Recreation, Water rights, Land tenure, Federal reservations, Reservation doctrine, Court decisions, Legislation, Treaty, Mexican Water Treaty, Water law, Administration, Administrative agencies.

This is a notice of reservation of water use to the United States out of the Colorado River. This reservation is made pursuant to the Boulder Canyon Project Act and is consistent with a recent United States Supreme Court decree. Eight-hundred-acre-feet of water in Arizona and one-thousand-acre-feet of water in California are reserved for use on federal lands. This is to be administered by the Bureau of Land Management of the Department of the Interior. The water is for culinary, sanitary, and related nonagricultural domestic uses in concession areas and cabin sites involved in the Bureau's recreational program. These federal reservations of water are subordinate to all existing rights to the use of the Colorado River waters and they are also subordinate to rights described in existing water delivery contracts entered into by the Secretary of the Interior, and the provisions of the Mexican Water Treaty of 1944. The reservation of water for use in Arizona is also subject to provisions of the Colorado River Basin Project Act, and the Contract for Delivery of Water between the United States and Arizona. (Sperling-Florida)
W75-01731

AUTHORIZE ACQUISITION OF BIG CYPRESS NATIONAL FRESH WATER RESERVE.
Committee on Interior and Insular Affairs (U.S. Senate).
Sen. Bill No 334, 93d Cong, 1st Sess, 1973. 6 p.

Descriptors: *Legislation, *Florida, *Watersheds(Basins), *Watershed management(Applied), *Water supply, Water quality, Water requirements, Water law, Water resources, Estuaries, Water resources development, Forest management, Freshwater fisheries, Wetlands, Water shortage, Water sources, Recreation, Land use, Government finance, Inter-agency cooperation, Ecology, Environmental effects, Conservation.

This bill authorizes the acquisition of the Big Cypress National Fresh Water Reserve in the State of Florida. The unique natural environment of the Big Cypress area of southwestern Florida should be protected from further development which would significantly and adversely affect its ecology. The Big Cypress is a fragile area, and the continued viability of Everglades National Park and certain of the estuarine fisheries of south Florida are directly dependent upon fresh water of adequate quality and volume from the Big Cypress area. In order to effectuate the purpose of this Act, the Secretary of the Interior is authorized to acquire lands, waters and interests therein within the Big Cypress area. However, the boundaries of the area may not encompass more than 547,000 acres of privately owned land. Owners of lands so required shall have the right to restricted use of that land for a specified period of time. The Secretary may enter into agreements with Florida or any political subdivision thereof to administer the property acquired pursuant to this Act. (Ritchie-Florida)
W75-01732

NATIONAL FLOOD INSURANCE ACT OF 1968.
U.S. Senate, Washington, D.C. Committee on Banking, Housing and Urban Affairs (U.S. Senate).
Sen Bill No 390, 93d Cong, 1st Sess, 1973. 6 p.

Descriptors: *Federal government, *Legislation, *Government finance, *Floods, *Flood damage, *Flood plain insurance, Economics, Insurance, Flood plains, Flood protection, Nonstructural alternatives, Legal aspects, Flood plain zoning, Floodways, River flow, Regulation, State governments, Federal government, Water policy.

This bill, to be cited as the National Insurance Act Amendments of 1973, increases the insurance limits available under the existing act. It also provides that no federal agency shall enter into any contract for the insurance of any mortgage or real estate loan if the property to which such mortgage or loan relates is situated in a flood-plain area, unless such property is covered by the flood insurance program under this title. In the case of any unit of local government which is determined by the Secretary of Housing and Urban Development to be located in an area which has special flood hazards, and which is not participating in the flood insurance program, the Secretary of Housing and Urban Development, the Secretary of Agriculture and the Administrator of Veterans' Affairs shall reduce the aggregate federal benefits for such unit of local government by 10% in 1977, an additional 20% in 1978, an additional 30% in 1979, and by an additional 40% in 1980. (Ritchie-Florida)
W75-01733

GENERAL POLICIES--PROPOSED RULES AND REGULATIONS.
Susquehana River Basin Commission, Harrisburg, Pa.
Federal Register, Vol 37, No 196, p 21355-21358, October 7, 1972.

Descriptors: *River basin development, *River basin commissions, *River basins, *Legislation, *Water policy, Water management(Applied), Long-term planning, Water pollution, Water pollution control, Water supply, Flood plain zoning, Watershed management, Recreation, New York, Pennsylvania, Maryland, Water conservation, Water utilization, Inter-agency cooperation, Water resources, Water resources development, Regulation, Multiple-purpose projects.
Identifiers: *Administration regulation.

The Governors of the States of New York, Pennsylvania, and Maryland and a representative of the President of the United States are the members of the Susquehanna River Basin Commission. The purpose of the Commission is to effect comprehensive multiple purpose planning for the conservation, utilization, development, management and control of the water and related natural resources of the basin. The Susquehanna River Basin Compact provides generally that no project affecting the water resources of the basin shall be undertaken prior to approval of the Commission. The signatory states have as their primary responsibility, water quality management and control. However, protection of the basin's resources from pollution and actions to achieve abatement and control of pollution are important to the Commission. The Compact requires that the Commission formulate and adopt a comprehensive plan for the immediate and long-range development and use of the water resources of the basin. The plan should contain provisions relating to water supply, water quality, flood plain management, watershed management, recreation and electric power generation. (Ritchie-Florida)
W75-01734

NEWLANDS RECLAMATION PROJECT, NEVADA--OPERATING CRITERIA AND PROCEDURES.
Department of the Interior, Washington, D.C.

Federal Register, Vol 37, No 69, p 7109-7110, April 8, 1972.

Descriptors: *Water storage, *Nevada, *Reservoir operation, *Water supply, *Measurement, Coordination, Adoption of practices, Regulation, Administration, Monitoring, Reservoir storage, Federal government, Planning, Irrigation water, Storage capacity, Water conservation, Water distribution(Applied), Natural resources, Reservoir yield, Rivers, Water rights, Water allocation(Policy), Water requirements.
Identifiers: Administrative regulations.

This is a notice of the issuance of operating criteria by the Secretary of the Interior for coordinated operation and control of two Nevada rivers in connection with the Newlands Reclamation Project. The Truckee-Carson Irrigation District, in order to satisfy its needs for irrigation diversions, will maximize its use of Carson River water and minimize the use of Truckee River water. The total water supplied to the district will be the amount required for irrigation of the lands actually under irrigation production in 1972 in the exercise of water rights consistent with the Carson and Truckee River Decrees. The total water supply will be measured at a gauging station at several points on the Truckee Canal. There will be no water for single purpose power generation, although power may be generated with water from Lahontan Reservoir, which is either uncontrollable spill or a precautionary drawdown. The operation of Derby Diversion Dam, Truckee Canal, and Lahontan Reservoir will be coordinated. These operating criteria will allow diversions for Lahontan Reservoir storage on the basis of its water-surface elevation and accumulated precipitation. (Sperling-Florida)
W75-01735

CLEANING UP THE WILLAMETTE,
For primary bibliographic entry see Field 5G.
W75-01776

FEDERAL COMMON LAW APPLICABLE TO INTERSTATE POLLUTION CASES-ILLINOIS V. CITY OF MILWAUKEE, 406 U.S. 91 (1972),
For primary bibliographic entry see Field 5G.
W75-01777

ADDITIONAL POWERS OF MUNICIPALITY UPON RECEIPT OF ORDER TO CEASE POLLUTION.
W. Va. Code Ann., sec 16-13-23a (1967).

Descriptors: *West Virginia, *Legislation, *Cities, *Water pollution control, *Water pollution abatement, Municipal wastes, Waste disposal, Waste treatment, Sewage treatment, Sewage disposal, Treatment facilities, Water quality, Water quality control, Water resources, Water management, Structures, Environmental engineering.

Municipal corporations, which have received or which hereafter receive orders issued by the chief of the division of water resources or the West Virginia water resources board requiring them to cease the pollution of any stream or waters, are authorized to establish equitable rates or charges for the use of the services and facilities of the existing sewer system or for the use of facilities to be rendered upon completion of any works and system necessary by virtue of said order. The charges shall be paid by the owner, tenant or occupant of each and every parcel of real estate connected to and using any part of such sewer system. Furthermore the municipalities may construct, operate and maintain any facilities necessary to assure the proper fulfillment of this statue's provisions and incorporate the costs thereof into the just and equitable rates and charges so provided. (Silber-Florida)
W75-01778

LIABILITY OF WATER SUPPLIER FOR DAMAGES RESULTING FROM FURNISHING IMPURE WATER,
J. T. Bockrath.
54 A.L.R. 3d, 936-963, (1974).

Descriptors: *Judicial decisions, *Water supply, *Water law, *Legal aspects, Water delivery, Water demand, Water resources, Water management(Applied), Water pollution, Water pollution effects, Water quality, Water quality control, Common law, Negligence, Penalties(Legal), Public rights, Damages, Pollutants.

This annotation collects the cases in which the liability of a water supplier, be it private or municipal, has been determined for damages resulting from furnishing impure water. Sound public policy makes incumbent upon water suppliers a duty of a high degree of faithfulness in furnishing a supply adequate in quantity and quality. This standard is merely the exercise of due care applied to the circumstances. Several cases have noted, however, that a water supplier is not an insurer of the quality of his product. Water suppliers may be private or municipal corporations, but the distinction is not ordinarily critical for purposes of liability for supplying impure water, since municipal water suppliers are held to be engaged in a proprietary function. Actual knowledge of the impurity is not essential to the imposition of liability. It is sufficient if in the exercise of ordinary care commensurate with the duty owed, the supplier should have known or discovered the dangerous condition of the water supply. (Ritchie-Florida)
W75-01780

INTERSTATE ENVIRONMENTAL COMPACT.
N.C. Gen Stat, secs, 113A-21 through 113A-23 (1971).

Descriptors: *North Carolina, *Legislation, *Environment, *Environmental control, *Pollution abatement, *Governmental interrelations, Federal government, State governments, Inter-agency cooperation, Environmental effects, Jurisdiction, Coordination, Water pollution, Water pollution control, Administrative agencies, Interstate, Federal jurisdiction, State jurisdiction, Legal aspects.

The North Carolina legislature has enacted the Interstate Environmental Compact, thereby acknowledging that certain environmental pollution problems transcend state boundaries, and thus require cooperative efforts. The purposes of the signatories in enacting this compact are: to assist and participate in the national environmental protection programs as set forth in federal legislation; to promote intergovernmental cooperation for multi-state action relating to environmental protection through interstate agreements; and to encourage cooperative and coordinated environmental protection by the signatories and the federal government. Any two or more signatories may enter into supplementary agreements for joint, coordinated or mutual environmental management activities relating to interstate pollution problems common to the territories of such states. In addition, signatories may enter into special supplementary agreements with the District of Columbia or foreign nations for the same purposes. Amendments to this compact may be initiated by legislative action of any signatory and become effective when concurred in by all signatories and approved by Congress. (Ritchie-Florida)
W75-01781

THE LEGAL CONTROL OF THE SEA, PREPARATIONS FOR THE 1973 CONFERENCE,
Oxford Univ. (England).
D. P. O'Connell.
Round Table, No 248, p 411-423, October, 1972.

Descriptors: *Oceans, *Natural resources, *Water resources development, *Ownership of beds, *Law of the sea, Administration, Regulation, United Nations, International waters, Legal aspects, Commercial fishing, Treaties, Governments, Institutional constraints, Economic aspects, Cost-benefit analysis, Jurisdiction, Political aspects, Marine geology, Continental shelf, Continental slope, Geomorphology, International laws.
Identifiers: *Coastal waters.

The first symptom of the breakdown of the legal control of the sea was the recurrent dispute over fisheries. After the Geneva Conference of 1958 failed to agree on the extent of the territorial sea, a fishery war occurred. The momentum for change occurred as attention focused on the mineral wealth of the ocean floor. In the United Nations it was proposed that the seabed beyond national jurisdiction be placed under international control to avoid a scramble for its resources. Some form of licensing would be employed. Royalties would be paid to the organization for the development of the poorer and landlocked nations. Economics of deepsea exploitation, not the United Nations, is the main reason why the predicted scramble for the seabed has not yet occurred. The issue that has developed is the boundary between national jurisdiction and the land beyond that boundary. A continental shelf idea was developed, and as a safety factor, an alternative two hundred meter isobath, the average point of the beginning of the declivity of the abyssal seabed. Attention has thus been focused on the geomorphology of the seabed. (Sperling-Florida)
W75-01782

COSTLY NEW CHALLENGE FOR WATER POLLUTERS.
Business Week, p 42, October 28, 1972.

Descriptors: *Regulation, *Standards, *Water quality control, *Water pollution sources, Environmental effects, permits, Administrative agencies, Adoption of practices, Waste water treatment, Treatment facilities, Water pollution control, Water resources, Economic aspects, Social aspects, Environmental sanitation, Effluents, Cost-benefit analysis, Direct costs, Economic feasibility, Water reuse.
Identifiers: *Administrative regulations, *Hazardous substances(Pollution).

Every company that discharges waste into any waterway is required to apply for a permit to the Environmental Protection Agency. By July 1, 1977 companies must install the best practicable control technology. By July 1, 1983 companies must install the best available control technology. Zero discharge, the complete elimination of water pollution is the goal for 1985. To obtain in a permit, each company must disclose the amount and nature of its pollutants, and it must meet existing state water quality standards. A commission will study the total economic, social, and environmental effects of the best available standard. If the costs are prohibitively high, the standard will be modified for some plants or industries. The earlier system required states to set effluent limits for all polluters. These limits varied according to the waterway's assimilative capacity, whether the waterway was used for recreation, and the nature of the pollutant. This scheme was difficult to enforce. What is needed is a shift from terminal treatment plants to closed recycling systems. (Sperling-Florida)
W75-01783

EFFLUENT CHARGES, TOWARDS A NEW ENVIRONMENT,
For primary bibliographic entry see Field 5G.
W75-01784

A CONGRESSIONAL VIEWPOINT OF COASTAL AND MARINE-RELATED AFFAIRS,
Committee on Commerce (U.S. Senate). Sub-committee on Oceans and Atmosphere.
J. F. Hussey.
In: Report of the Governors' Conference on Marine Resources, December 17-18, 1973. Charleston, South Carolina, p 11-13, (1973).

Descriptors: *Coasts, *Oceans, *Marine biology, *Natural resources, *Coastal engineering, Coastal marshes, Coastal structures, Resources development, Land use, Water utilization, Resource allocation, Legal aspects, Legislation, Harbors, Recreation, Water quality, Land management, Land development, Water resources development.
Identifiers: Coastal zone management.

A resolution is to be introduced in the Senate authorizing a Senate Oceans Policy Study. The resolution will bring together all of the jurisdictional interests of the Senate involving the ocean. The need for marine-related programs is obvious, because the oceans offer the means to help solve energy, food and raw materials problems. The National Coastal Zone Management Act will provide twelve million dollars to coastal states for the purpose of implementing land use programs in the coastal zone. But these areas are under tremendous economic pressure to provide housing space, port facilities, industrial sites, power plant siting and recreation areas. The main problem for coastal siting of huge industrial facilities is available land, and the destruction of irreplaceable coastal land for economic uses is a growing source of conflict. Another major concern for coastal resource management is commercial fishing. (Ritchie-Florida)
W75-01785

STATE AND LOCAL ROLES IN COASTAL AREA PLANNING AND MANAGEMENT,
North Carolina Univ., Chapel Hill. Inst. of Government.
M. S. Heath, J. M. Waddell, and L. Dusenbury.
In: Report of the Governor's Conference on Marine Resources, Charleston, South Carolina, December 17-18, 1973. p 27-34, (1973).

Descriptors: *Coasts, *Planning, *Management, *Governmental interrelations, *Regional development, Area redevelopment, Non-structural alternatives, Coordination, Governments, Alternative planning, Programs, Social aspects, Inter-agency cooperation, State governments, Local governments.
Identifiers: *Coastal zone management.

A panel discussed state and local roles in coastal area planning and management, especially the following two basic problems: first, is the primary responsibility for coastal zone management in the state or in local government; secondly, what should be the role of these levels of government. The first speaker noted the states apply three different approaches: total state control, state and local cooperation, or a regional approach. The second speaker felt the focal point of coastal planning should be at the state level, citing three reasons: development of the area's differing socio-economic conditions; a need to consider state and local interests along the coast; and specific interests to be considered in arriving at planning and management decisions. The final speaker discussed the role of local governments in coastal zone management and pointed out several reasons why local governments' role has been less than exemplary such as the fact that local governments are influenced by development that will add to the tax rolls. (Craig-Florida)
W75-01786

REGIONAL MANAGEMENT OF FISHERY RESOURCES,
Georgia Dept. of Natural Resources, Brunswick. Game and Fish Div.
D.H.G. Gould, E. B. Joseph, A. F. Chestnut, and W. A. Zachowski.
In: Report of the Governors' Conference on Marine Resources, Charleston, South Carolina. December 17-18, 1973, p 69-74, (1973).

Descriptors: *Fish management, *Commercial fishing, *Fish conservation, *Fisheries, *Resources development, Political aspects, State governments, Administrative agencies, Administration, Legislation, Natural resources, South Carolina, Georgia, Florida, Interstate compacts, Economic aspects, Project planning, Productivity, Coordination, Adoption of practices, Water law, Federal government, Cooperatives.
Identifiers: Coastal waters, Administrative regulations.

Considerable attention has been directed towards regional management of fishery resources. Recent interest has been generated by activities of state agencies and the National Marine Fisheries Service in connection with the proposed State-Federal Fisheries Management Program. This program will provide joint management plans for selected marine fisheries to be carried out cooperatively by the states involved with the specific resources and the federal government. This cooperative concept is not new. More than twenty-seven years ago the Atlantic States Marine Fisheries Commission proposed a joint management plan for the shrimp fishery in South Carolina, Georgia, and the east coast of Florida. The plan involved the closing of creeks and rivers in all three states, and the closing of inside bays in South Carolina and Georgia for four months. The plan was jeopardized when South Carolina, under pressure from in-state shrimpers, passed legislation requiring a license fee for out-of-state boats. Attempts to establish regional management plans for other fisheries have been equally unproductive, but coordinated regional management programs have great advantages and must be continued. (Sperling-Florida)
W75-01788

PUBLIC PARTICIPATION IN WATER POLLUTION CONTROL.
Environmental Protection Agency, Washington, D.C.
Federal Register, Vol 38, No 163, p 22756-22758, August 23, 1973.

Descriptors: *Federal Water Pollution Control Act, *Regulation, *Adoption of practices, *State governments, *Project planning, Administrative agencies, Administration, Federal government, Permits, Standards, Effluents, Waste water disposal, Environmental sanitation, Water conservation, Non-structural alternatives, River basin, Coordination, Legislation, Programs, Water allocation(Policy), Water resources development.
Identifiers: *Administrative regulations.

The Administrator of the Environmental Protection Agency has proposed regulations specifying minimum guidelines for public participation in certain processes under the Federal Water Pollution Control Act. These regulations provide for, encourage, and assist public participation in the development, revision, and enforcement of any regulation, standard effluent limitation, or plan. They describe provisions required in a minimum public participation program at state and federal levels of governmental activity for water pollution control. Some provisions call for a summary report on public participation efforts in relation to certain actions, and give minimum procedural guidelines for public hearings. Other regulations give more explicit requirements for public hearings and other procedures related to particular programs. Emphasis on public development is at three levels. At the first level is the development of state programs including priority lists for allocation of resources. On the second level, preparation of basin wide plans and selection between alternative projects. The third level is in the case-by-case consideration of local projects and permit applications. (Sperling-Florida)
W75-01790

THE 'DISTANCE PLUS JOINT DEVELOPMENT ZONE' FORMULA: A PROPOSAL FOR THE SPEEDY AND PRACTICAL RESOLUTION OF THE EAST CHINA AND YELLOW SEAS CONTINENTAL SHELF OIL CONTROVERSY,
L. B. Terr.
Cornell International Law Journal, Vol 7, No 1, p 49-71, December 1973. 79 ref.

Descriptors: *Continental shelf, *International law, *Ownership of beds, *Oil, *Legal aspects, Natural resources, Boundaries(Property), Beds, Boundary disputes, Water law, Water rights, Treaties, International waters, Resources development, Islands, Marine geology, Exploration, Exploitation.
Identifiers: Taiwan, Japan, Korea, *Yellow Sea, *East China Sea.

The discovery in the continental shelf beneath the Yellow and East China Seas of prolific petroleum deposits caused a scramble for oil rights among the adjoining coastal nations of Taiwan, Japan and South Korea. Despite plans by the three nations for cooperative development, mainland China's claim of sovereignty over substantial portions of the disputed shelf area brought development negotiations to a halt. Recent studies of the Northeast Asian oil dispute have stopped short of proposing any viable solution. These studies have unquestioningly assumed that the rules governing rival claims to a common continental shelf must be based upon either the 'equidistance' principle recommended by the 1958 Geneva Convention, or the 'natural prolongation of land territory' principle, as enunciated in the North Sea Continental Shelf Cases. However, the controversy requires intensive reconsideration of international continental shelf doctrine in an effort to derive suitable alternatives for effecting a practical settlement. The North Sea Cases expressly sanction agreement between disputant States based upon 'equitable principles'; such an agreement should be designed to resolve the Northeast Asian oil dispute. (Ritchie-Florida)
W75-01791

SAVING THE SEASHORE--MANAGEMENT PLANNING FOR THE COASTAL ZONE,
R. Romero, and J. Schenkel.
Hastings Law Journal, Vol 25, No 1, p 191-211, November 1973. 172 ref.

Descriptors: *Coasts, *Wetlands, *Regulation, *Legislation, *Federal government, *Planning, Coastal plains, Marshes, Tidal marshes, Shore protection, Coastal engineering, Seashores, Management, Comprehensive planning, Governmental interrelations, Legal aspects, Permits, Non-structural alternatives, Regional development, *California.
Identifiers: *Coastal zone management.

Until recently, planning and management of the coastal zones was left almost entirely to local governments. In 1972, Congress passed the Coastal Zone Management Act of 1972. This Act provides incentive to the states to enact legislation for coastal zone management and establishes quidelines for the kinds of state programs which will qualify for federal assistance. Any state and certain specific territories bordering on the Atlantic or Pacific Oceans, the Gulf of Mexico, Long Island Sound, or the Great Lakes is eligible to receive annual federal grants to assist in the development of coastal zone management programs. The Act relies on voluntary compliance by the states and fails to provide for interim controls during the planning of management programs. The provisions of the California Coastal Zone Conservation Act of 1972 are examined as a blueprint for state programs enacted pursuant to the federal act.

The California act intents to protect the coastal zone through a state-wide master plan. Regional commissions will assist in developing a master plan by 1975. Control of development during the interim period is provided through permits. (Craig-Florida)
W75-01792

WATER POLLUTION OF BOUNDARY WATERS OF THE GREAT LAKES SYSTEM FROM AGRICULTURAL, FORESTRY AND OTHER LAND USE ACTIVITIES.
International Joint Commission-United States and Canada.
For primary bibliographic entry see Field 5G.
W75-01793

WATER POLLUTION OF LAKES SUPERIOR AND HURON.
International Joint Commission United States and Canada.
For primary bibliographic entry see Field 5G.
W75-01794

CONSERVATION EASEMENTS: THE MAINE COAST EXAMPLE,
Maine Coast Heritage Trust, Bar Harbor.
For primary bibliographic entry see Field 6F.
W75-01797

OCEAN WASTE DISPOSAL: A VIOLATION OF THE PUBLIC TRUST DOCTRINE,
Duquesne Univ., Pittsburgh, Pa. School of Law.
For primary bibliographic entry see Field 5B.
W75-01798

DEPOSITING DEAD ANIMALS OR OFFENSIVE MATERIALS IN OR NEAR WATER.
West Virginia Code Ann secs 16-9-2 and 16-9-3 (1967).

Descriptors: *West Virginia, *Legislation, *Water law, *Pollution control, *Waste disposal, Animal wastes, Water pollution sources, Animals, Environmental sanitation, Environment, Sewage disposal, Water quality control, Land management, Land utilization, Rivers, Streams, Water sources, Groundwater, Water utilization, Pollution abatement, Legal aspects, Governments, Water policy, Public rights.

Any person who knowingly and willfully throws or releases any dead animal, carcass, garbage, sink or shower waste, organic substance, human or animal excrement, contents of privy vault, septic tank, cesspool or nauseous, offensive or poisonous substance into any well, cistern, spring, brook, pond, stream or other body of water used for domestic purposes shall be guilty of a misdemeanor. The provisions shall not apply to those commercial or industrial wastes which are subject to the regulatory control of the West Virginia department of natural resources or the air pollution control commission. Any person who throws or releases any dead animal, garbage or other waste into any river, creek or other stream, or upon the surface of any land adjacent to any river, creek or other stream in such a location that it might be washed into such waters, or any person who throws or releases any such offensive materials upon the surface of any road, right of way, street, alley or public ground, or who being an owner or occupier of any said lands knowlingly permits any such offensive materials to remain thereon shall be guilty of a misdemeanor. (Silber-Florida)
W75-01800

U.S. GEOLOGICAL SURVEY ROLE IN PLANNING,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 6B.
W75-01852

FISHERIES ACT IS KEY TO WATER QUALITY,
Department of the Environment, Ottawa (Ontario).
For primary bibliographic entry see Field 5G.
W75-01872

WE'RE RED-TAPED TO A STANDSTILL,
For primary bibliographic entry see Field 5G.
W75-01887

SAFE TO DRINK TREATED WASTEWATER.
American Water Works Association, New York.
For primary bibliographic entry see Field 5D.
W75-01938

WATER POLLUTION PROBLEMS IN THE REPUBLIC OF SINGAPORE,
Mander, Raikes and Marshall, Bristol (England).
For primary bibliographic entry see Field 5G.
W75-01941

ACCOMODATING TO NEW IMPERATIVES IN WATER POLLUTION CONTROL,
Cincinnati Univ., Ohio. Medical Center.
For primary bibliographic entry see Field 5G.
W75-01942

DEVELOPMENT OF THE RIO GRANDE COMPACT OF 1938,
R. A. Hill.
Natural Resources Journal, April, 1974, Vol 14, No 2, p 163-199, 1 fig.

Descriptors: *Water resources development, *Water supply development, *Interstate commissions, *Water policy, Water supply, *Water management(Applied), *Rio Grande River, *River flow, Comprehensive planning, Optimum development plans, Regional development, Texas, Colorado, New Mexico, Mexico, Legal aspects.
Identifiers: *Rio Grande Compact of 1938, Rio Grande Compact of 1929, Elephant Butte Reservoir, Fort Quitman.

The Rio Grande Compact of 1938 materialized from the need for interstate water management of the Rio Grande River and deals with the drainage basin above Fort Quitman, located 80 miles southeast of El Paso, Texas. Rising in Colorado, the river flows southward through New Mexico, then between Texas and Mexico for over 1600 miles and is used primarily for irrigation. A history of water shortages and increased demands led to an investigating commission to establish the initial compact in 1929. Precedents such as an appointed commissioner from each signatory state, provisions for an equitable apportionment of use of water, and administrative powers were incoporated into the 1938 compact. The National Resources Committee in 1935 began a second investigation into water management of the drainage basin which culminates in a report dealing with groundwater resources, water utilization, quality of water and water importation and storage. A brief account of basic positions of states and engineering factors is given. Final compact included a schedule of deliveries with the normal release of usable water to be 790,000 acre-feet per year, general and administrative provisions such as new stream gaging stations, and a course of action to follow when one signatory state impinges on the rights of another. Although condemned by some as being unduly complicated, poorly written and uncertain intent, the compact does provide a procedure for allocating the insufficient water supply. (Salzman-North Carolina)
W75-01946

MAKE WATER POLLUTION CONTROL A MEANINGFUL LOCAL RESPONSIBILITY,
Muncie Sanitary District, Ind. Water Quality Div.
For primary bibliographic entry see Field 5G.
W75-01948

ECONOMIC IMPACT OF FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS ON THE PULP AND PAPER INDUSTRY,
Crown Zellerbach Corp., Camas, Wash. Dept. of Manufacturing Services.
For primary bibliographic entry see Field 5G.
W75-02007

HYDROLOGY OF SMOOTH PLAINLANDS OF ARID AUSTRALIA.
Australian Water Resources Council, Canberra.
For primary bibliographic entry see Field 7A.
W75-02046

MAP SHOWING AREAS SERVICED BY PUBLIC WATER-SUPPLY AGENCIES IN 1973, GREATER PITTSBURGH REGION, SOUTHWESTERN PA.,
Geological Survey, Pittsburgh, Pa.
For primary bibliographic entry see Field 7C.
W75-02137

SHORELINE DEVELOPMENT: POLICY ISSUES IN NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand).
For primary bibliographic entry see Field 6B.
W75-02168

SOME ENVIRONMENTAL CONSIDERATIONS IN THE DESIGN AND CONSTRUCTION OF A LARGE HYDRO-ELECTRIC SCHEME,
Snowy Mountains Engineering Corp., Cooma (Australia). Hydrology Branch.
For primary bibliographic entry see Field 6G.
W75-02181

SOIL AND WATER MANAGEMENT, A LOCAL AUTHORITY VIEWPOINT,
Shire Council, Pittworth (Australia).
R. T. Stirling.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia Report No 41, p 3.1-3.8, September 1974.

Descriptors: *Local governments, *Government interrelations, *Water resources development, Regional development, Social aspects, Project planning, Administration, *Australia, Soil conservation.
Identifiers: *Queensland(Aust).

Administrative aspects of soil and water management are very often regarded as falling exclusively within the province of State-wide authorities. However, it is clear that local authorities have certain rights and responsibilities as representatives of the community in an area which is subject to important projects. Recommendations are made for increased and improved local participation in policy development and implementation in Queensland. (CSIRO)
W75-02186

SOIL AND WATER MANAGEMENT IN AREAS OF SOIL EROSION HAZARD,
Department of Primary Industries, Brisbane (Australia). Soil Conservation Branch.
For primary bibliographic entry see Field 4D.
W75-02187

6F. Nonstructural Alternatives

PLAIN TALK ABOUT FLOOD PLAINS,
Minnesota Dept. of Natural Resources, St. Paul. Div. of Waters, Soils and Minerals.
J. M. Wright.

The Minnesota Volunteer, p 38-44, January-February, 1973. 4 fig.

Descriptors: *Minnesota, *Flood plains, *Flood protection, *Comprehensive planning, *Legislation, Flood control, Flood plain zoning, Flood data, Flood damage, State governments, State jurisdiction, Federal government, Water resources development, River basin development, Water control, Water management(Applied), Building codes, Administrative agencies, Costs, Research and development, Research facilities, Water policy, Data collections, Adoption of practices.
Identifiers: *Administrative regulations.

Methods are indicated by which flood damages can be reduced in Minnesota. The background of flood management control describes the settlers' predisposition to settle near watercourses, the reliance on local government aid after floods, the initiation of federal aid in the Flood Control Act of 1936, and the traditional emphasis on control of floods and their effects. The control is no longer recognized as the sole means of solving flood problems. Expense, environmental concerns and continuing development outside the protected areas are other considerations. The best solution, delineated in the Flood Plain Management Act (1969), is a comprehensive flood plain management approach utilizing traditional measures where justified, in conjunction with effective regulatory controls, development policies and programs, and comprehensive land use planning. The change to this comprehensive approach has been slow and difficult because local officials have been reluctant to vary from past procedures and the policy of the federal government. The detailed studies necessary to implement such a policy are presently lacking. The research and development assistance programs of the Minnesota Department of the Natural Resources, the Corps of Engineers, the U.S. Geological Survey and the Soil Conservation Service are designed to provide the necessary information. (Dillingham-Florida)
W75-01720

NATIONAL FLOOD INSURANCE ACT OF 1968.
U.S. Senate, Washington, D.C. Committee on Banking, Housing and Urban Affairs (U.S. Senate).
For primary bibliographic entry see Field 6E.
W75-01733

WATER RELATED LAND USE PLANNING GUIDELINES,
Interstate Commission on the Potomac River Basin, Bethesda, Md.
For primary bibliographic entry see Field 4A.
W75-01789

CONSERVATION EASEMENTS: THE MAINE COAST EXAMPLE,
Maine Coast Heritage Trust, Bar Harbor.
B. R. Emory.
Underwater Naturalist, Vol 8, No 1, p 8-11, June, 1973. 3 photo.

Descriptors: *Easements, *Legal aspects, *Maine, Conservation, Land management, Taxes, Assessments, Non-structural alternatives, Property values, Real property, Legislation, Coasts.
Identifiers: *Conservation easements, Injunctive relief.

Legislation, ordinances, court injunctions and land acquisitions are among the tools which have been used to protect fragile coastal areas from destruction by speculators. A non-profit organization formed by Maine coastal property owners has encouraged the use of a new legal tool to prevent overdevelopment. The group urges the use of conservation easements, which require future owners to comply with whatever restrictions the easement imposes on the property's use. The conservation easement program began after passage by the Maine legislature of a statute authorizing government agencies to accept such easements. The easements are therefore granted to a proper state agency which must inspect the protected property for violations of the easement's terms, and, if necessary, obtain an injunction against the violator. However, the grantor of the easement still controls who is allowed on his land, so that the grant does not imply that the land is open to public use. Financial incentives exist for the granting of such easements. The reduction in market value is an allowable deduction from federal income taxes, and in states like Maine, where tax assessors must take enforceable restrictions into account, may also reduce property taxes as well. (Ritchie-Florida)
W75-01797

FLOOD PLAIN INFORMATION, WELLS CREEK AND TRIBUTARIES, CITY OF ERIN, TENNESSEE.
Army Engineer District, Nashville, Tenn.
For primary bibliographic entry see Field 4A.
W75-01933

SPECIAL FLOOD HAZARD INFORMATION REPORT: TOMBIGEE RIVER, ABERDEEN TO AMORY, LOWER TOWN CREEK, MONROE COUNTY, MISSISSIPPI.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-01934

FLOOD PLAIN INFORMATION: PEARL RIVER-NEELY CREEK, VICINITY OF JACKSON, HINDS, RANKIN AND MADISON COUNTIES, MISS.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-01935

FLOOD PLAIN INFORMATION: RABBIT CREEK, ANCHORAGE, ALASKA.
Army Engineer District, Anchorage, Alaska.
For primary bibliographic entry see Field 4A.
W75-01936

FLOOD PLAIN INFORMATION: MONONGAHELA RIVER, GREENE COUNTY, PENNSYLVANIA.
Army Engineer District, Pittsburgh, Pa.
For primary bibliographic entry see Field 4A.
W75-01937

6G. Ecologic Impact Of Water Development

HOW MUCH RECYCLING IS ENOUGH,
Resources for the Future, Inc., Washington, D.C.
T. Page.
In: Cycling and Control of Metals, Proceedings of an Environmental Resources Conference, October 31-November 2, 1972, Ohio. National Environmental Research Center, Cincinnati, Ohio, p 173-177, February, 1973. 1 fig.

Descriptors: *Pollution abatement, *Recycling, *Economics, Heavy metals, Comprehensive planning, Planning, Natural resources, Withdrawal, Depreciation.

Greater recycling is often suggested as a solution to too much waste being produced and too few raw materials available. There is a conflict between those who want to conserve, rather than use, all resources and those who say that when materials run out the markets will favor recycling automatically. The economists' efficiency point of view on recycling is explained with the assumed concept of perfect markets. Internalization of costs of disposal of pollutants is seen as desirable and would encourage conservation and recycle of raw materials. Depletion of raw materials is discussed from the viewpoint of effects within one generation and effects between the present and future generations. Ownership of valuable materials by one group and their disowning of burdensome materials encourages depletion of resources although speculation on the rising costs of valuable materials may encourage reservation of resource usage till a later time. The concept of the present-value welfare criterion is introduced to help judge where to strike a balance between favoring present generations over future ones and favoring future generations (with improved technology) over the present. Incentives should be provided so that the resources of the earth are not depleted for the future. (See also W74-09206) (Eagle-Vanderbilt)
W75-01699

A REPORT TO: THE PRESIDENT AND THE CONGRESS, BY THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, FIRST ANNUAL REPORT.
National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01711

AUTHORIZE ACQUISITION OF BIG CYPRESS NATIONAL FRESH WATER RESERVE.
Committee on Interior and Insular Affairs (U.S. Senate).
For primary bibliographic entry see Field 6E.
W75-01732

INTERSTATE ENVIRONMENTAL COMPACT.
For primary bibliographic entry see Field 6E.
W75-01781

SAVING THE SEASHORE--MANAGEMENT PLANNING FOR THE COASTAL ZONE,
For primary bibliographic entry see Field 6E.
W75-01792

MODELS FOR PLANNING AND RESEARCH FOR THE SOUTH FLORIDA ENVIRONMENTAL STUDY,
Florida Univ., Gainesville. Resource Management Systems Program.
For primary bibliographic entry see Field 6A.
W75-01803

ENVIRONMENTAL IMPACT OF LAND USE ON WATER QUALITY: A WORK PLAN. BLACK CREEK STUDY, MAUMEE RIVER BASIN, ALLEN COUNTY, INDIANA. PLANNING PHASE. WORK PLAN. REDUCTION OF SEDIMENT AND RELATED POLLUTANTS IN THE MAUMEE RIVER AND LAKE ERIE.
Allen County Soil and Water Conservation District, Fort Wayne, Ind.
For primary bibliographic entry see Field 5C.
W75-01930

SOME ENVIRONMENTAL CONSIDERATIONS IN THE DESIGN AND CONSTRUCTION OF A LARGE HYDRO-ELECTRIC SCHEME,
Snowy Mountains Engineering Corp., Cooma (Australia). Hydrology Branch.
J. A. H. Brown.
Civil Engineering Transactions, The Institution of Engineers Australia, Vol CE16, No 2, p 130-137, 1974. 5 fig, 2 tab, 23 ref, appendix.

Descriptors: *Environmental effects, *Hydroelectric plants, *Legislation, *Australia, Reservoirs, National parks, Engineering structures, Mountains, Ecology, Watershed management, Soil conservation, Sedimentation.
Identifiers: Kosciusko National Park(N.S.W.), Snowy Mountains Hydroelectric Scheme.

A brief summary is given of the main features of the Snow Mountains Hydroelectric Scheme, and of the provisions of the Act governing the operations of the Snowy Mountains Authority relating to catchment protection. The steps which have been taken in investigation, design, construction and operation of the Scheme to prevent or ameliorate adverse effects on the Kosciusko National Park, in which the Scheme is located, are outlined. Some of the effects which have occurred are discussed, and it is concluded that the Scheme in itself does not present any threat of practical importance to the environment of the region. A discussion is also provided of the ways in which the Scheme itself could be vulnerable to changes in the ecology of the area. (CSIRO)
W75-02181

ENVIRONMENTAL ASSESSMENT OF RAISING LESLIE DAM,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
W. C. Boughton.
In: Symposium on Management of Water Resources, September 6, 1974, Warwick, Queensland, Australia. Water Research Foundation of Australia, Report No 41, p 2.1-2.11. 1 fig.

Descriptors: *Water resources development, *Environmental effects, *Reservoirs, Recreation facilities, Reservoir construction, Water supply, *Australia.
Identifiers: *Condamine River(Qld), Leslie Dam.

An environmental impact study of the effects of proposed enlargements to Leslie Dam in the upper Condamine area was carried out in November 1972. The procedures adopted and the results obtained are described and discussed. It is concluded that the existing works have not revealed any environmental problems; and only beneficial effects on water supply and recreational facilities may be expected to result from the extensions. (CSIRO)
W75-02185

7. RESOURCES DATA

7A. Network Design

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, SOUTHEASTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01820

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, CENTRAL REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01821

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30 1971, WESTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-01822

PRECIPITATION NETWORK DESIGN FOR LARGE MOUNTAINOUS AREAS,
Atmospheric Environment Service, Ottawa (Ontario).
For primary bibliographic entry see Field 2B.
W75-01965

THE RELATION OF RAINFALL NETWORK DENSITY TO ACCURACY OF RUNOFF PREDICTION IN A MOUNTAINOUS BASIN,
Colorado State Univ., Fort Collins.
For primary bibliographic entry see Field 2B.
W75-01969

SOME RAINFALL FEATURES IN MOUNTAINOUS AREAS OF COLOMBIA AND THEIR IMPACT ON NETWORK DESIGN,
World Meteorological Organization, Bogota (Colombia). Servicio Colombiano de Meteorologia e Hidrologia.
For primary bibliographic entry see Field 2B.
W75-01970

HYDROLOGY OF SMOOTH PLAINLANDS OF ARID AUSTRALIA.
Australian Water Resources Council, Canberra.
Hydrological Series No 6, Australian Government Publishing Service, Canberra, 1972. 24 p, 7 fig, 3 tab, 33 ref.

Descriptors: *Hydrology, *Hydrologic data, *Data processing, *Arid lands, *Australia, Ecology, Ecological distribution, Instrumentation, Rainfall, Arid climates, Aerial photography, Semi-arid climates, Land classification.

An Advisory Panel on the Hydrology of Smooth Plain Areas was appointed to investigate and propose appropriate methods of hydrologic data collection and analysis for arid and semi-arid catchments of low relief where there are only minor contributions to underground water or to surface drainage. Findings, conclusions, and recommendations of the Advisory Panel are presented. A map was prepared of the area under consideration; the hydrological situations were categorized into 16 land type classes by an ecological classification. The Panel's recommendations included a co-ordinated study of the smooth plains hydrology by a program of observations and analysis at nine sites. Detailed recommendations were made with regard to site selection, instrumentation, data processing and interpretation of results. (Mastic-Arizona)
W75-02046

THE DEVELOPMENT OF CLIMATOLOGICAL INSTRUMENTATION SYSTEMS FOR USE IN A NUMBER OF REMOTE LOCATIONS,
Bureau of Meteorology, Melbourne (Australia).
For primary bibliographic entry see Field 2B.
W75-02172

7B. Data Acquition

MEASUREMENT OF THE ALLUVIAL DEPOSIT TRANSPORT BY MEANS OF RADIOACTIVE TRACERS (MESSUNG DES FLUSSSEDIMENT-TRANSPORTES MIT HILFE RADIOACTIVER MARKIERUNG),
Technical Univ. of Budapest (Hungary). Dept. of Water Economy.
For primary bibliographic entry see Field 5B.
W75-01767

REMOTE-SENSING STUDIES OF HYDROLOGIC ENVIRONMENTS IN THE LOWER RARITAN RIVER SYSTEM, NEW JERSEY,
Geological Survey, Trenton, N.J.
For primary bibliographic entry see Field 5B.
W75-01850

VELOCITY-HEAD ROD AND CURRENT METER USE IN BOULDER-STREWN MOUNTAIN STREAMS,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 4A.
W75-01862

POLLUTION CONTROL STARTS WITH ANALYSIS.
For primary bibliographic entry see Field 5A.
W75-01889

APPARATUS FOR EXTRACTING A LIQUID SAMPLE AT VARIOUS DEPTHS OF A LIQUID STREAM,
Nielsen Engineering and Research Inc., Mountain View, Calif. (assignee)
J. Crumal.
United States Patent 3,813,945. Issued June 4, 1974. Official Gazette of the United States Patent Office, Vol 923, No 1, p 76, June, 1974. 1 fig.

Descriptors: *Patents, *Sampling, Streams, Tubes, Separation techniques, Liquids.
Identifiers: Pump plunger.

A hollow elongated tube with an opening near its lowest end descends into a stream. A plunger within the tube normally positioned below the opening rises upward within the tube after the tube reaches the bottom of the stream. This forces a liquid sample out the top of the tube. A second plunger may be employed within the tube normally positioned above the opening to act as a pump plunger descends through the stream of liquid. The pump plunger travel may be controlled as a function of height of the opening of the tube within the stream. A method has been patented in order to obtain a liquid sample that contains various constitutents in the same proportion as the liquid stream. (Prague-FIRL)
W75-01894

MULTI-CAPACITY WATER SAMPLER,
S. J. Niskin.
United States Patent 3,815,422. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 464, June 11, 1974. 1 fig.

Descriptors: *Patents, *Water sampling, Sea water, Equipment.

A water sampler device for obtaining samples of ocean water at designated depths consists of tubular members of identical shape and size clamped together to form a receptacle of any desired capacity with a closure or valve for both ends of the receptacle. This is maintained away from the upper opening to permit sea water to flow through the receptacle as it is lowered and sinks to the desired depth of water. Upon release of a messenger, the closures are released simultaneously whereby the lower closure passes through the upper opening to become seated on the lower opening while the upper closure seats on the upper opening to be locked in position by cams. The weight of the water trapped in the receptacle maintains the lower cap in a sealed position on the lower opening as the sampler is brought to the surface of the ocean. (Sandoski-FIRL)
W75-01903

DISCUSSION OF PROBLEMS IN MEASURING PRECIPITATION IN MOUNTAINOUS AREAS,
National Weather Service, Silver Spring, Md. Hydrologic Research and Development Lab.
For primary bibliographic entry see Field 2B.
W75-01962

MISSISSIPPI RIVER FLOOD MAPS FROM ERTS-1 DIGITAL DATA,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
For primary bibliographic entry see Field 2E.
W75-01974

MAPPING OF THE 1973 MISSISSIPPI RIVER FLOODS BY THE NOAA-2 SATELLITE,
National Environmental Satellite Service, Washington, D.C.
For primary bibliographic entry see Field 2E.

W75-01981

FLOOD HAZARD STUDIES IN THE MISSISSIPPI RIVER BASIN USING REMOTE SENSING,
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
For primary bibliographic entry see Field 2E.
W75-01983

TOTAL SEDIMENT DISCHARGE SAMPLING OVER SILLS,
Forest Service (USDA), Cadillac, Mich. North Central Forest Experiment Station.
For primary bibliographic entry see Field 2J.
W75-01986

A TECHNIQUE USED TO DETERMINE RANDOM POINT POSITION,
Central and Southern Florida Flood Control District, West Palm Beach. Water Planning Div.
S-F. Shih, and R. L. Hamrick.
Water Resources Bulletin, Vol 10, No 5, p 884-898, October 1974. 7 fig, 1 tab, 8 ref, 2 append.

Descriptors: *Mathematical studies, *Surfaces, *Monte Carlo method, *Digital computers, Computer models, Statistical methods, Simulation analysis, Computer programs, Data processing, Stochastic processes.
Identifiers: *Arbitrary-shaped boundary, Integration, Boundary-value problems.

It is convenient in many cases to solve an analytical problem by reducing it to a corresponding random process and then simulating that process. The Monte Carlo method helps to model such processes easily in a digital computer. A technique was developed to determine whether a random point falls within an arbitrary-shaped boundary. The general principle of this procedure is to represent the planform by a polygon with as few sides as possible without changing the basic shape of boundary. A radial line constructed in any direction from a given point must cross the boundary an odd number of times if the point is located within the boundary. Applications of the technique to practical problems such as size of bounded area, integration, and boundary-value problems were demonstrated. A computer program and flow chart were included. Comparison of results obtained with the developed method with those obtained with others indicated that the new method is more applicable and powerful than other methods. (Singh-ISWS)
W75-01988

SEA ICE BOTTOMSIDE FEATURES IN THE DENMARK STRAIT,
Naval Oceanographic Office, Washington, D.C. Polar Oceanography Div.
For primary bibliographic entry see Field 2C.
W75-01993

A PREDICTOR-CORRECTOR METHOD FOR SOLVING THE CONVECTION-DISPERSION EQUATION FOR ADSORPTION IN POROUS MEDIA,
Maryland Univ., College Park. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2G.
W75-01998

VISUAL ASSESSMENT OF TOTAL PLANT RELATIVE WATER CONTENT, WITH THE AID OF PHOTOGRAPHIC STANDARDS AS A GUIDE TO SCHEDULING IRRIGATION,
Western Australian Dept. of Agriculture, Bunbury. District Office.
For primary bibliographic entry see Field 3F.
W75-02055

(COMMENT ON THE STORAGE OF MERCURY IN SURFACE WATER),
California State Dept. of Water Resources, Sacramento. Chemistry Lab.
For primary bibliographic entry see Field 5A.
W75-02071

ATOMIC ABSORPTION SPECTROSCOPY-STAGNANT OR PREGNANT,
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Chemical Physics.
For primary bibliographic entry see Field 2K.
W75-02087

OPERATING APPARATUS FOR WATER SAMPLERS,
Trippensee Corp., Saginaw, Mich. (Assignee).
T. L. Duperon.
US Patent No 3,814,162, 4 p, 7 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 927, No 3, p 874, October 15, 1974.

Descriptors: *Patents, *Water sampling, *Water quality control, Equipment.
Identifiers: Water samplers, Kemmerer samplers.

Apparatus constructed according to the invention is adapted for use in conjunction with a water sampler of the Kemmerer type have a cylindrical, tubular body open at both ends. A connecting rod extending through the body is fixed at one end to a closure for the lower end of the body and carries an enlargement at the other end for engagement with and disengagement from a latching clasp supported on a closure for the upper end of the body. The latching clasp comprises a pair of segment-shaped plates between which the enlargement is adapted to be retained, each of the plates having an upstanding motion transmitting member operable to move the plates apart and effect release of the enlargement. The clasp plates preferably are biased to move toward one another by two springs which straddle the connecting rod. (Sinha-OEIS)
W75-02155

AN INSTRUMENT FOR THE MEASUREMENT OF FIBRE IN EFFLUENT,
Australian Paper Manufacturers Ltd., Melbourne (Australia).
For primary bibliographic entry see Field 5A.
W75-02166

THE DEVELOPMENT OF CLIMATOLOGICAL INSTRUMENTATION SYSTEMS FOR USE IN A NUMBER OF REMOTE LOCATIONS,
Bureau of Meteorology, Melbourne (Australia).
For primary bibliographic entry see Field 2B.
W75-02172

7C. Evaluation, Processing and Publication

GENERAL REPORT,
Geological Survey, Fort Collins, Colo.
D. Dawdy.
In: Proceedings of International Symposium on Uncertainties in Hydrologic and Water Resource Systems, Vol III, University of Arizonia, Tucson, December 11-14, 1972: Arizona University Publication, p 1555-1566, 1972. 1 fig, 1 ref.

Descriptors: *Data collections, *Network design, *Systems analysis, *Risks, Operations research, Probability, Simulation analysis, Mathematical models, Statistical models, Statistical methods, Hydrologic data, Flood forecasting, Water management(Applied), Remote sensing.
Identifiers: *Operational hydrology.

Several papers on the worth of hydrologic data are reviewed. Decision theory can help in answering the question of how much of what kind of data to collect where. Most hydrologic data have been collected without any explicit consideration of the worth of data. Data collection has grown in response to social pressures, such as the floods in 1936 and 1938 on the Mississippi River, and the resulting network of data has resulted from a budgeting-bargaining process. Decision theory and Bayesian analysis provide a framework for intelligent conversation. Basic data programs may be structured more rationally within that framework. (See also W73-14166) (Knapp-USGS)
W75-01652

COMPARISON OF THE RESULTS OF A COMPUTER CALCULATION OF WATER EXCHANGE OF THE AERATION ZONE AND GROUNDWATERS WITH LYSIMETRIC OBSERVATIONS, (IN RUSSIAN),
V. P. Emetes, L. L. Zhuravleva, V. Ya. Kulik, and N. V. Pichugina.
Dokl Vses (Ordena Lenina) Akad S-Kh Nauk Im V I Lenina. 9. p 44-45, 1973. Illus.
Identifiers: *Aeration zone, *Lysimetric data, Algorithm, Measurement, Groundwater, Surface-groundwater relationships.

An example is presented of the values of water exchange of the aeration zone with ground waters calculated by means of an algorithm on a computer and measured by means of lysimeters. The correspondence between the calculated and measured water exchange of the aeration zone and groundwaters was satisfactory, indicating that the given method can be useful for calculating water flows in the aeration zone, at least during sufficiently long time intervals.--Copyright 1974, Biological Abstracts, Inc.
W75-01760

TEMPERATURE AND CHEMICAL DATA FOR SELECTED THERMAL WELLS AND SPRINGS IN SOUTHEASTERN CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 2K.
W75-01814

SUBSURFACE GEOLOGY AND GROUNDWATER RESOURCES OF THE JACKSON PURCHASE REGION, KENTUCKY,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 2F.
W75-01817

WATER RESOURCES DATA FOR NEBRASKA, 1972: PART 2. WATER QUALITY RECORDS.
Geological Survey, Lincoln, Nebr.
For primary bibliographic entry see Field 5A.
W75-01818

CATALOG OF AQUIFER NAMES AND GEOLOGIC UNIT CODES USED BY THE WATER RESOURCES DIVISION,
Geologic Survey, Reston, Va.
For primary bibliographic entry see Field 2F.
W75-01819

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, SOUTHEASTERN REGION,
Geological Survey, Reston, Va.
C. R. Showen, and N. G. Stuthmann.
Available from NTIS, Springfield, Va 22161 as PB-232 791/As $7.25 in paper copy, $2.25 in microfiche.

Descriptors: *Hydrologic data, *Southeast U.S., *Data storage and retrieval, *Surface waters, *Basic data collections, Streamflow, Reservoir storage, Reservoir stages, Water temperature, Alabama, Florida, Georgia, Kentucky, Mississip-

pi, North Carolina, Puerto Rico, South Carolina, Tennessee.

This report contains lists of stations in the Southeaster1128e . Geological Survey collects water data either on a continuous basis or at least on a daily basis. The files contain daily values for streamflow, reservoir levels or contents, water temperatures, specific conductance, and sediment discharge plus data for several other quality parameters that are measured by means of monitoring equipment or result from analyses of samples collected on a daily basis. The stations are listed according to station number within each State. The report lists the available retrieval options, the machine-readable output options, user charges, and how to obtain the data. (Knapp-USGS)
W75-01820

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30, 1971, CENTRAL REGION,
Geological Survey, Reston, Va.
C. R. Showen, and N. G. Stuthmann.
Available from NTIS, Springfield, Va. 22161 as PB-232 790, $11.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 27-73, June 1973. 442 p, 7 fig, 2 tab.

Descriptors: *Hydrologic data, *Data storage and retrieval, *Central U.S., *Surface waters, *Basic data collections, Streamflow, Reservoir storage, Reservoir stages, Water temperature, Arkansas, Colorado, Iowa, Kansas, Louisiana, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming.

This report contains lists of stations at which the U.S. Geological Survey collects water data in the Central U.S. either on a continuous basis or at least on a daily basis. The files contain daily values for streamflow, reservoir levels or contents, water temperatures, specific conductance, and sediment discharge plus data for several other quality parameters that are measured by means of monitoring equipment or result from analyses of samples collected on a daily basis. The stations are listed according to station number within each State. The report lists the available retrieval options, the machine-readable output options, user charges, and how to obtain the data. (Knapp-USGS)
W75-01821

INDEX TO U.S. GEOLOGICAL SURVEY COMPUTER FILES CONTAINING DAILY VALUES FOR WATER PARAMETERS TO SEPTEMBER 30 1971, WESTERN REGION,
Geological Survey, Reston, Va.
C. R. Showen, and N. G. Stuthmann.
Available from NTIS, Springfield, Va. 22161 as PB-232 793, $10.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 28-73, June 1973. 387 p, 7 fig, 2 tab.

Descriptors: *Hydrologic data, *Data storage and retrieval, *Surface waters, *Basic data collections, Reservoir storage, Reservoir stages, Streamflow, Water temperature, Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Washington.

This report contains lists of stations in the Western Region of the U.S., at which the U.S. Geological Survey collects water data either on a continuous basis or at least on a daily basis. The files contain daily values for streamflow, reservoir levels or contents, water temperatures, specific conductance, and sediment discharge plus data for several other quality parameters that are measured by means of monitoring equipment or result from analyses of samples collected on a daily basis. The stations are listed according to station number within each State. The report lists the available retrieval options, the machine-readable options, user charges, and how to obtain the data. (Knapp-USGS)
W75-01822

HYDROLOGIC DATA FOR URBAN STUDIES IN THE DALLAS, TEXAS METROPOLITAN AREA, 1972,
Geological Survey, Austin, Tex.
B. C. Massey, and C. M. Wood.
Open-file report, June 1974. 135 p, 4 fig, 3 tab, 6 ref.

Descriptors: *Urban hydrology, *Basic data collections, *Texas, *Rainfall-runoff relationships, Streamflow, Data collections, Hydrologic data.
Identifiers: *Dallas(Tex).

Investigations were designed to evaluated hydrologic factors affecting floods on several small streams in Dallas, Texas. The objectives of the Dallas area program are to determine the magnitude, frequency, and areal extent of flooding, on the basis of historical data and hydrologic analyses; to document and define floods of greater than ordinary magnitude; and to determine the effect of urban development on flood peaks and volume. The studies involve the collection of precipitation, runoff, and flood-elevation data in seven drainage basins within the city and in three drainage basins outside the city in Dallas County. Two of the seven study areas in Dallas have headwaters in rural areas outside the city limits, but the largest part of each drainage basin is within the city. (Knapp-USGS)
W75-01825

WASTE-LOAD ALLOCATION STUDIES FOR ARKANSAS STREAMS, RED RIVER BASIN, MOUNTAIN FORK, SEGMENT 1D,
Geological Survey, Little Rock, Ark.
For primary bibliographic entry see Field 5B.
W75-01841

SUSPENDED- AND BEDLOAD-SEDIMENT TRANSPORT IN THE SNAKE AND CLEARWATER RIVERS IN THE VICINITY OF LEWISTON, IDAHO, JULY, 1973 THROUGH JULY, 1974,
Geological Survey, Boise, Idaho.
For primary bibliographic entry see Field 2J.
W75-01842

WATER-LEVEL FLUCTUATIONS OF LAKES IN FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 2H.
W75-01845

BATHYMETRY OF CANNIKIN LAKE, AMCHITKA ISLAND, ALASKA, WITH AN EVALUATION OF COMPUTER-MAPPING TECHNIQUES,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 2H.
W75-01849

U.S. GEOLOGICAL SURVEY ROLE IN PLANNING,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 6B.
W75-01852

FIELD AND COMPUTER PROCEDURES FOR GULLY CONTROL BY CHECK DAMS,
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 4D.
W75-01863

THE MEDWAY WATER BOARD TELEMETRY AND TELECONTROL SYSTEM,
Westinghouse Brake and Signal Co. Ltd., Chippenham (England). Automation Div.
For primary bibliographic entry see Field 5F.
W75-01914

FLOOD PLAIN INFORMATION, WELLS CREEK AND TRIBUTARIES, CITY OF ERIN, TENNESSEE.
Army Engineer District, Nashville, Tenn.
For primary bibliographic entry see Field 4A.
W75-01933

SPECIAL FLOOD HAZARD INFORMATION REPORT: TOMBIGEE RIVER, ABERDEEN TO AMORY, LOWER TOWN CREEK, MONROE COUNTY, MISSISSIPPI.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-01934

FLOOD PLAIN INFORMATION: PEARL RIVER-NEELY CREEK, VICINITY OF JACKSON, HINDS, RANKIN AND MADISON COUNTIES, MISS.
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 4A.
W75-01935

FLOOD PLAIN INFORMATION: RABBIT CREEK, ANCHORAGE, ALASKA.
Army Engineer District, Anchorage, Alaska.
For primary bibliographic entry see Field 4A.
W75-01936

FLOOD PLAIN INFORMATION: MONONGAHELA RIVER, GREENE COUNTY, PENNSYLVANIA.
Army Engineer District, Pittsburgh, Pa.
For primary bibliographic entry see Field 4A.
W75-01937

DISTRIBUTION OF PRECIPITATION IN MOUNTAINOUS AREAS, VOLUME 1.
For primary bibliographic entry see Field 2B.
W75-01961

ESTIMATION OF AREAL PRECIPITATION,
Main Geophysical Observatory, Leningrad (USSR).
For primary bibliographic entry see Field 2B.
W75-01966

COMPUTING ACTUAL PRECIPITATION,
Agricultural Research Service, Boise, Idaho. Northwest Watershed Research Center.
For primary bibliographic entry see Field 2B.
W75-01967

THE VARIATION OF MEAN ANNUAL RAINFALL WITH ALTITUDE AND LOCALITY IN SOUTH AFRICA, AS DETERMINED BY MULTIPLE CURVILINEAR REGRESSION ANALYSIS,
Department of Water Affairs, Pretoria (South Africa). Div. of Hydrology.
For primary bibliographic entry see Field 2B.
W75-01971

THE DISTRIBUTION OF ATMOSPHERIC PRECIPITATION IN ALBANIA, (LA REPARTITION DES PRECIPITATIONS ATMOSPHERIQUES EN ALBANIA),
Instituti Hidrometeorologijik, Tirana (Albania).
For primary bibliographic entry see Field 2B.
W75-01972

MISSISSIPPI RIVER FLOOD MAPS FROM ERTS-1 DIGITAL DATA,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
For primary bibliographic entry see Field 2E.
W75-01974

THE PROBABILITY OF CONSECUTIVE RAINLESS DAYS,
Forest Service (USDA), Ogden, Utah. Intermountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 2B.
W75-01976

MODELING OF STOCHASTIC-DETERMINISTIC HYDROLOGIC SYSTEMS,
Monash Univ., Clayton (Australia). Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W75-01977

MAPPING OF THE 1973 MISSISSIPPI RIVER FLOODS BY THE NOAA-2 SATELLITE,
National Environmental Satellite Service, Washington, D.C.
For primary bibliographic entry see Field 2E.
W75-01981

FLOOD HAZARD STUDIES IN THE MISSISSIPPI RIVER BASIN USING REMOTE SENSING,
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
For primary bibliographic entry see Field 2E.
W75-01983

BAROCLINIC COASTAL JETS IN LAKE ONTARIO DURING IFYGL,
Woods Hole Oceanographic Institution, Mass.
For primary bibliographic entry see Field 2H.
W75-01984

A TECHNIQUE USED TO DETERMINE RANDOM POINT POSITION,
Central and Southern Florida Flood Control District, West Palm Beach. Water Planning Div.
For primary bibliographic entry see Field 7B.
W75-01988

LIMITATIONS IN THE USE OF DOUBLE-MASS CURVES,
Ministry of Works, Wellington (New Zealand). Water and Soil Div.
For primary bibliographic entry see Field 2E.
W75-01989

COMPARISON OF RECENT SEAWATER FREEZING POINT DATA,
Rhode Island Univ., Kingston. Graduate School of Oceanography.
For primary bibliographic entry see Field 2C.
W75-01999

HYDROLOGY OF SMOOTH PLAINLANDS OF ARID AUSTRALIA.
Australian Water Resources Council, Canberra.
For primary bibliographic entry see Field 7A.
W75-02046

CROPLAND ATLAS OF ARIZONA,
Arizona Crop and Livestock Reporting Service, Phoenix, Arizona.
H. M. Mayes.
Oct. 1974. 68 p.

Descriptors: *Crops, *Arizona, *Aerial photography, *Mapping, *Terrain analysis, Irrigated land, Land use, Fruit crops, Horticultural crops, Pastures, Citrus fruits, Vegetable crops, Productivity, Statistics.

Of the total land area of Arizona, 1.6 million acres or 2 percent are cropland. Locations, size and shape, of all agricultural fields were mapped from high-altitude aerial photography. Cropland includes field crops, citrus groves, deciduous fruit and nut orchards, vineyards and pastureland. Nonirrigated rangelands used to graze cattle are not included. NASA photography between May 1972 and October 1973 is the basis for the mapping. The 48 frames are arranged by counties; agricultural statistics by crops, acreage, yield per harvested acre, and production shown in tabular form; and a state summary is included. (Paylore-Arizona)
W75-02047

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, CENTRAL REGION,
Geological Survey, Reston, Va.
C. R. Showen, and O. O. Williams.
Available from NTIS, Springfield, Va. 22161 as PB-232 922/As, $21.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 23-73, June 1973. 954 p, 5 fig, 1 tab, append.

Descriptors: *Hydrologic data, *Water quality, *Central US, *Data storage and retrieval, *Basic data collections, Arkansas, Colorado, Iowa, Kansas, Louisiana, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming.

This report lists water quality stations operated by the Geological Survey in the Central U.S. for which data are available in machine-readable form. The data are the results of analyses of water samples and indicate the chemical and physical characteristics of surface water and groundwater. The stations are listed according to station number within each State. The water quality data are identified by 5-digit parameter codes and are grouped into 21 parameter categories. The analytical results for all samples in any one year are then grouped within the parameter categories. The report lists the available retrieval options, the machine-readable output options, user charges, and how to obtain the data. (Knapp-USGS)
W75-02116

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, WESTERN REGION,
Geological Survey, Reston, Va.
C. R. Showen, and O. O. Williams.
Available from NTIS, Springfield, Va. 22161 as PB-232 794/As, $12.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 24-73, June 1973. 516 p, 5 fig, 1 tab, append.

Descriptors: Hydrologic data, *Water quality, *Data storage and retrieval, *Basic data collections, Arizona, California, Hawaii, Alaska, Idaho, Nevada, Oregon, Washington.
Identifiers: *Western US.

This report lists water quality stations operated by the Geological Survey in the Western U.S. for which data are available in machine-readable form. The data are the results of analyses of water samples and indicate the chemical and physical characteristics of surface water and groundwater. The stations are listed according to station number within each State. The water quality data are identified by 5-digit parameter codes and are grouped into 21 parameter categories. The analytical results for all samples in any one year are then grouped within the parameter categories. The report lists the available retrieval options, the machine-readable output options, user charges, and how to obtain the data. (Knapp-USGS)
W75-02117

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, SOUTHEASTERN REGION,
Geological Survey, Reston, Va.
C. R. Showen, and O. O. Williams.
Available from NTIS, Springfield, Va. 22161 as PB-232 793/As, $10.25 in paper copy, $2.25 in microfiche. Water-Resources Investigations 22-73, June 1973. 757 p, 5 fig, 1 tab, append.

Descriptors: *Hydrologic data, *Water quality, *Southeast US, *Data storage and retrieval, *Basic data collections, Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee.

This report lists water quality stations operated by the Geological Survey in the Southeastern U.S. for which data are available in machine-readable form. The data are the results of analyses of water samples and indicate the chemical and physical characteristics of surface water and groundwater. The stations are listed according to station number within each State. The water quality data are identified by 5-digit parameter codes and are grouped into 21 parameter categories. The analytical results for all samples in any one year are then grouped within the parameter categories. The report lists the available retrieval options, the machine-readable output options, user charges, and how to obtain the data. (Knapp-USGS)
W75-02118

MAGNITUDE AND FREQUENCY OF FLOODS IN NEW JERSEY WITH EFFECTS OF URBANIZATION,
Geological Survey, Trenton, N.J.
For primary bibliographic entry see Field 4C.
W75-02119

SUMMARY AND EVALUATION OF CREST-STAGE-GAGE DATA IN NEW YORK,
Geological Survey, Albany, N.Y.
For primary bibliographic entry see Field 2E.
W75-02120

RECONNAISSANCE BATHYMETRY OF PYRAMID LAKE, WASHOE COUNTY, NEVADA,
Geological Survey, Carson City, Nev.
E. E. Harris.
Nevada Division of Water Resources, Carson City, Water Resources--Information Series Report 20, 1974. 1 sheet, 1 map, 3 fig, 2 tab, 2 ref.

Descriptors: *Lakes, *Nevada, *Bathymetry, *Surveys, *Sounding, Mapping, Aerial photography, Lake morphometry, Lake morphology, Water level fluctuations, *Maps.
Identifiers: *Pyramid Lake(Nev).

Pyramid Lake, about 30 miles northeast of Reno, Nev., is the terminal water body of the Truckee River system. The principal inflow to the lake is from the Truckee River; local drainage around the lake contributes little. There is no outlet stream; therefore the only outflow is by evaporation. Important tools in the evaluation of Pyramid Lake from a management and recreation standpoint are physiographic and hydrologic surveys. From 1909 to 1968 the lake level declined from an altitude of 3,869 feet to 3,789 feet above sea level, or 80 feet in 59 years. For the present survey, section corners and east-west section lines were used to locate accurately the present shoreline and control points for the fathometer survey grid. A boat-mounted recording fathometer was used to obtain cross-sectional profiles of the lake bottom. Twenty-three cross-sectional profiles were run in an east-west direction at one-mile intervals. One long profile was run roughly north-south from The Needle Rocks to Anaho Island. Additional fathometer soundings were made around The Nee-

dle Rocks, Anaho Island, The Pyramid, the mouth of the Truckee River, and several beach areas along the west shore. Hand soundings were made as checks on fathometer readings at 6, 25, 68, 282, and 322 feet. Aerial photography was obtained to provide details on the present shoreline configuration. The fathometer profiles and aerial photographs were used to contour the lake bottom. (Knapp-USGS)
W75-02121

HYDROLOGIC REGIMEN OF WALKER LAKE, MINERAL COUNTY, NEVADA,
Geological Survey, Carson City, Nev.
F. E. Rush.
Nevada Division of Water Resources, Carson City, Water Resources--Information Series Report 21, 1974. 1 sheet, 7 fig, 1 map, 1 tab, 15 ref.

Descriptors: *Lakes, *Nevada, *Water level fluctuations, *Water balance, Evaporation, Runoff, Streamflow, *Maps, Limnology, Hydrologic budget.
Identifiers: *Walker Lake(Nev).

Walker Lake is about 60 miles southeast of Carson City, Nev. The lake is used principally for recreation--boating, water skiing, and fishing. There is considerable concern for the future of the lake because of its rapid stage recession. The altitude of the lake's surface has receded from about 4,083 feet in 1882 to 3,970 feet in 1968 and the surface area has decreased from nearly 69,000 acres to 38,000 acres. The maximum depth in 1968 was about 118 feet. At the present rate of recession, the lake may not reach new equilibrium until the lake level recedes another 70 feet, at which time the area might be approximately 25,000 acres and the depth 40 feet. (Knapp-USGS)
W75-02122

PRELIMINARY MAP SHOWING AVAILABILITY OF GROUND WATER FROM MAJOR GLACIAL-DRIFT AQUIFERS IN GRIGGS AND STEELE COUNTIES, NORTH DAKOTA,
Geological Survey, Grand Forks, N Dak.
J. S. Downey.
Open-file release, March 4, 1974. 1 sheet, 1 map, 3 ref.

Descriptors: *Aquifers, *Water yield, *North Dakota, Glacial drift, Till, Gravels, Hydrogeology, *Maps, Hydrologic data, Data collections.
Identifiers: *Griggs County(ND), *Steele County(ND).

This preliminary map of occurrence and potential yield of aquifers is part of an intensive study of Griggs and Steele Counties, North Dakota. A well inventory provided data on depth, construction, and productivity of private and public wells. Test drilling provided information regarding the thickness, grain size, and extent of the aquifers. Potential well yields were estimated from the thickness and hydraulic conductivity of the water-bearing materials logged at each test hole, and from aquifer tests. Generally, the yield of a well is proportional to the hydraulic conductivity and thickness of the aquifer. Aquifers occur both in glacial drift and in underlying bedrock formations in Griggs and Steele Counties. Glacial drift, which covers most of the counties, is as much as 550 feet thick in pre-existing bedrock valleys. The aquifers in Griggs and southwestern Steele Counties are formed in glaciofluvial materials deposited within and overlying valleys deeply incised in the bedrock. Where the valleys are deep and the glacial drift is thick, two or more saturated sand and gravel layers may be interbedded with, and confined by, layers of till and silt and clay. The aquifers in eastern Steele County are parts of two deltaic deposits. The northern aquifer is mostly silt and fine-grained sand. Yields from the aquifer are generally not much greater than 10 gal/min. In southeastern Steele County, the aquifer materials range from silt to fine gravel. Yields from the aquifer vary considerably, but may be as much as 1,000 gal/min in the thicker parts. (Knapp-USGS)
W75-02123

FLASHING FLOW IN HOT WATER GEOTHERMAL WELLS: COMPUTER PROGRAM,
Geological Survey, Menlo Park, Calif.
M. Nathenson.
Available from NTIS, Springfield, Va. 22161, as PB-233 123, $3.75 in paper copy, $2.25 in microfiche. Geological Survey Computer Program USGS-GD-74-021, May 1974. 31 p, 1 fig, 15 ref, 3 append.

Descriptors: *Computer programs, *Geothermal studies, *Boiling, *Thermodynamics, Thermal water, Water wells, Groundwater movement.
Identifiers: *Geothermal energy, *Geothermal wells, *Flashing flow, Multiphase flow.

A PL/I computer program is presented for calculating the production characteristics of hot water geothermal wells which flash to steam-water mixtures in the cased portion of the hole. The flashing flow is assumed to be isenthalpic and, for purposes of calculating pressure drop, a finely dispersed mixture of equal average velocity. The flow in the aquifer is treated using steady radial Darcy flow. The thermodynamic properties of saturated water and steam are obtained using interpolation and a stored set of steam tables. (Knapp-USGS)
W75-02124

WATER-RESOURCES APPRAISAL OF RAILROAD AND PENOYER VALLEYS, EAST-CENTRAL NEVADA,
Geological Survey, Carson City, Nev.
For primary bibliographic entry see Field 2E.
W75-02125

WATER RESOURCES OF THE UPPER NEUSE RIVER BASIN, NORTH CAROLINA,
Geological Survey, Raleigh, N.C.
For primary bibliographic entry see Field 2E.
W75-02127

HYDROLOGY OF THE ABANDONED COAL MINES IN THE WYOMING VALLEY, PENNSYLVANIA,
Geological Survey, Harrisburg, Pa.
For primary bibliographic entry see Field 5B.
W75-02128

MAP SHOWING DRAINAGE AREAS, MIDDLE HADDAM QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas, and J. E. Palmer.
Miscellaneous Field Studies Map MF-630 A, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Drainage basins, *Connecticut, *Watersheds(Basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: *Middle Haddam(Conn).

A map shows stream systems and drainage areas that contribute streamflow to selected sites on streams in the Middle Haddam quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02129

CONTOUR MAP OF THE BEDROCK SURFACE, GREENFIELD QUADRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
C. J. Londquist, and B. P. Hansen.
Miscellaneous Field Studies Map MF-629 A, 1974. 1 sheet, 1 map, 9 ref.

Descriptors: *Maps, *Massachusetts, Bedrock, Geology, Contours, Subsurface investigations.
Identifiers: *Greenfield(Mass).

Contours show the altitude of the bedrock surface in the Greenfield quadrangle, Massachusetts. The position of the contours is based largely on data from wells, test holes, geophysical studies, and published geologic maps supplemented by knowledge of the geologic history of the region. The map shows the configuration of the bedrock surface as if all unconsolidated earth materials were removed. (Knapp-USGS)
W75-02130

MAP SHOWING DRAINAGE AREAS, SPRING HILL QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas, and D. B. Meade.
Miscellaneous Field Studies Map MF-622 A, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Connecticut, *Watersheds(basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: Spring Hill(Conn).

A map shows systems and drainage areas that contribute streamflow to selected sites on streams in the Spring Hill quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02131

CONTOUR MAP OF THE BEDROCK SURFACE, MOUNT TOBY QUANDRANGLE, MASSACHUSETTS,
Geological Survey, Boston, Mass.
C. J. Loundquist.
Miscellaneous Field Studies Map MF-621 A, 1974. 1 sheet, 1 map, 3 ref.

Descriptors: *Maps, *Massachusetts, *Bedrock, Geology, Contours, Subsurface investigations.
Identifiers: *Mt. Toby(Mass), *Amherst(Mass).

A contour map shows the altitude of the bedrock surface in the Mount Toby quandrangle, Massachusetts. The position of the contours is based largely on data from wells, test holes, geophysical studies, and a surficial geologic map supplemented by the knowledge of the geologic history of the region. The map shows the configuration of the bedrock surface as if all unconsolidated earth materials were removed. (Knapp-USGS)
W75-02132

MAP SHOWING DRAINAGE AREAS, ESSEX QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas.
Miscellaneous Field Studies Map MF-587 D, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Connecticut, *Watersheds(Basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: *Essex(Conn).

A map shows stream systems and drainage areas that contribute streamflow to selected sites on streams in the Essex quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02133

MAP SHOWING DRAINAGE AREAS, CLINTON QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas, and J. E. Palmer.

Miscellaneous Field Studies Map MF-553 B, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Connecticut, *Watersheds(Basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: *Clinton(Conn).

A map shows stream systems and drainage areas that contribute streamflow to selected sites on streams in the Clinton quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02134

MAP SHOWING DRAINAGE AREAS, DEEP RIVER QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas, and J. E. Palmer.
Geological Survey Miscellaneous Field Studies Map MF-524 C, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Connecticut, *Watersheds(Basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: *Deep River(Conn).

A map shows stream systems and drainage areas that contribute streamflow to selected sites on streams in the Deep River quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02135

MAP SHOWING DRAINAGE AREAS, MOODUS QUADRANGLE, CONNECTICUT,
Geological Survey, Hartford, Conn.
M. P. Thomas.
Miscellaneous Field Studies Map MF-510 C, 1974. 1 sheet, 1 map, 1 ref.

Descriptors: *Drainage area, *Connecticut, *Watersheds(Basins), River basins, *Maps, Streamflow, Runoff.
Identifiers: *Moodus(Conn).

A map shows stream systems and drainage areas that contribute streamflow to selected sites on streams in the Moodus quadrangle, Connecticut. Drainage areas shown have not been adjusted for the manmade changes in the natural regimens such as storm sewers, diversion dams, canals, and tunnels. (Knapp-USGS)
W75-02136

MAP SHOWING AREAS SERVICED BY PUBLIC WATER-SUPPLY AGENCIES IN 1973, GREATER PITTSBURGH REGION, SOUTHWESTERN PA.,
Geological Survey, Pittsburgh, Pa.
R. M. Beall.
For sale by USGS, 1200 S. Eads St., Arlington, Va. 22202 Price $1.00 per set. Miscellaneous Field Studies Map MF-607, 1974. 2 sheets, 2 fig, 2 tab, 1 map, 13 ref.

Descriptors: *Water distribution(Applied), *Pennsylvania, *Distribution systems, Public utilities, Utilities, Water conveyance, Water demand, Water works.
Identifiers: *Pittsburgh(Penn).

A map and supplemental data tabulation compile general information on water service to municipal areas of the six-county Greater Pittsburgh region of southwestern Pennsylvania. Areas serviced by 154 public agencies and authorities, public utilities, and private water companies are shown as an overlay to the 1:125,000-scale regional map. Eleven systems of the region serve more than 10,000 residential customers and of these, two serve more than 100,000. Tables of selected system data document water used by categories of customers--residential, commerical, and industrial. Among the 11 systems with the largest number of residential customers, an average of 36% of the water used is in the residential category. The total estimated water use in 1973 by all systems documented here is about 370 million gallons per day. (Knapp-USGS)
W75-02137

THE NUMERICAL SOLUTION OF THE STEADY INTERFACE IN A CONFINED COASTAL AQUIFER,
James Cook Univ. of North Queensland, Townsville (Australia).
For primary bibliographic entry see Field 2F.
W75-02182

THE CONJUNCTIVE UTILISATION OF SURFACE AND GROUNDWATER SUPPLIES - A CASE STUDY,
Queensland Irrigation and Water Supply Commission, Brisbane (Australia).
For primary bibliographic entry see Field 4B.
W75-02183

8. ENGINEERING WORKS

8A. Structures

NEW DESIGNS OF PIPELAYING IMPLEMENTS FOR DRAIN BAGGERS (NOVYYE KONSTRUKTSII TRUBOUKLADYVAYUSHCHIKH PRISPOSOBLENIY DRENOUKLADCHIKOV),
V. L. Naryshkina, and B. N. Nedokuchayev.
Gidrotekhnika i Melioratsiya, Vol 3, No 4, p 68-71, April, 1974. 3 fig, 3 ref.

Descriptors: *Drainage, *Patents, Equipment, *Pipes.
Identifiers: Pipelaying, Earthenware pipes.

Tendencies in earthenware pipelaying technology for drainages are outlined on the basis of a review of foreign patents. Pipelaying equipment providing for circular cushioning layer should have forced pipe feeding to prevent the pipes from separating. For great depths, up to 4 m, pipelaying equipment should be provided with adequate implements for the correction of the height and angular position. To reduce friction and resistance during pipe feeding, the frictional pipe feeding mechanism should have roller bed guides rather than sliding guides. (Takacs-FIRL)
W75-01746

THE DESIGN OF FILTER ADAPTERS FOR IRRIGATION PIPES (O KONSTRUKTSII PRISOYEDINENIYA FIL'TRA K POLIVNOMU TRUBOPROVODU),
A. G. Vasil'ev.
Gidrotekhnika i Melioratsiya, Vol 3, No 4, p 61, April, 1974. 3 fig.

Descriptors: *Irrigation, *Pipelines, *Filters, Pipes, Sprinklers.
Identifiers: *Filter adapter.

New design of filter adapters for irrigation pipelines is presented. The filter, 20 mm in diameter and 175 mm in length, is placed in a pipe section with increased cross section at the beginning of the pipeline. The cross-section of the pipeline is equal to the annular cross section formed between the section of increased diameter and the tubular filter. The new design of the filter adapter reduced the coefficient of local resistance and the pressure by up to 6 to 8 times as compared with the conventional adapter without increased diameter. The filter is suitable for the retention of particles larger than 0.8 mm that are susceptible of clogging the sprinklers. (Takacs-FIRL)
W75-01747

METHOD AND APPARATUS FOR LAYING A PIPELINE,
Laser Alignment, Inc., Grand Rapids, Mich. (assignee)
R. Menzel.
United States Patent 3,827,155. Issued August 6, 1974. Official Gazette of the United States Patent Office, Vol 925, No 1, p 33, August, 1974. 1 fig.

Descriptors: *Patents, *Pipelines, Equipment, Pipes.
Identifiers: *Collinated light, Pipelaying.

A method and apparatus for laying a pipeline in which the pipes are aligned along a preselected path with a collimated light beam is described. Air is forced through the pipeline in a helical spiral to prevent gases from building up within the pipeline as the pipes are being laid. A blower unit coupled to an outlet nozzle has a clamp for clamping the nozzle to the pipe at an angle to the longitudinal axis of the pipe. (Prague-FIRL)
W75-01748

METHOD AND APPARATUS FOR LAYING A PIPELINE,
Laser Alignment, Inc., Grand Rapids, Mich. (assignee)
R. J. Roodvoets, and M. J. Applegate.
United States Patent 3,827,156. Issued August 6, 1974. Official Gazette of the United States Patent Office, Vol 925, No 1, p 33, August, 1974. 1 fig.

Descriptors: *Patents, *Pipelines, Pipes, Equipment.
Identifiers: *Pipelaying.

A method is described relating to the apparatus for laying a pipeline in which the pipes are aligned along a preselected path with a collimated light beam. Air is blown through the pipeline as the pipes are being laid to prevent the build up of gas within the pipeline. A blower unit and a flexible conduit are provided for this purpose. (Prague-FIRL)
W75-01749

CORNWALL'S NEW PVC TRUNK MAIN,
Chemidus Wavin Ltd., Durham (England).
For primary bibliographic entry see Field 5F.
W75-01769

GEOLOGIC ENVIRONMENT OF THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 8E.
W75-01846

EXPECTABLE EARTHQUAKES AND THEIR GROUND MOTIONS IN THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 8E.
W75-01847

WATER FACILITIES PLANNING ANALYSIS FOR THE CITY OF JACKSON, MISSISSIPPI.
Engineering Associates, Inc., Jackson, Miss.
For primary bibliographic entry see Field 3D.
W75-01929

UNDERGROUND RESERVOIR MAKES ROOM FOR PARK ABOVE,
Sacramento Div. of Water and Sewers, Calif.
For primary bibliographic entry see Field 4A.
W75-01951

HYDRAULICS OF CLOSED CONDUIT SPILLWAYS, PART XII: THE TWO-WAY DROP INLET WITH A FLAT BOTTOM,
Agricultural Research Service, Minneapolis, Minn.
For primary bibliographic entry see Field 8B.
W75-02000

URBAN STORMWATER DRAINAGE PLANNING AND ENVIRONMENTAL DESIGN,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
For primary bibliographic entry see Field 4A.
W75-02170

8B. Hydraulics

STATIC CALCULATION OF SEWAGE PIPES MADE FROM HIGH-PRESSURE POLYETHYLENE (STATISCHE BERECHNUNG VON ABWASSERROHREN AUS POLYAETHYLAN),
E. Gaube, W. Mueller, and F. Falcke.
Kunststoffe, Vol 64, No 4, p 193-196, April, 1974. 5 fig, 2 tab, 9 ref.

Descriptors: *Soil pressure, Soil properties, Calculations, Canals, Groundwater, *Plastic pipes, *Pipes, *Sewerage.
Identifiers: *Static calculations(Pipes).

Static calculations of high-pressure sewage pipes in different types of soil are presented. Separate calculations are given for polyethylene pipes laid over or under the groundwater level or in riverbeds. Pipes laid under the groundwater level or in riverbeds should be calculated both for deformation by soil pressure and for buckling due to the external overpressure of the groundwater or river water. Formulae for the determination of elliptical deformation due to soil pressure and for the buckling are presented. Pipes laid in soils with the properties of viscous liquid (such as in marshlands) should be calculated for buckling against the external liquid pressure. When using polyethylene pipes for relining existing canals, the buckling behavior of the pipes should be taken into account. (Takacs-FIRL)
W75-01745

STRESSES GENERATED IN NON-CIRCULAR TUNNEL CASINGS BY GROUNDWATER PRESSURE, (NAPRYAZHNENIYA, VOZNIKAYUSCHIYE V OBDELKAKH NEKRUGOVYKH TONNELEY OT DEYSTVIYA DAVLENIYA GRUNTOVYKH VOD),
N. N. Fotiyeva.
Fiziko-Teknicheskiye Problemy Razrabotki Poleznykh Iskopayemykh, No 1, p 18-23, 1974.

Descriptors: *Tunnels, *Equilibrium, Groundwater, *Pressure, Equipment, *Casings.
Identifiers: *Tunnel casings.

A method for the calculation of tunnel casings of irregular shape (with one symmetry axis) with respect to the stresses generated by groundwater pressure is presented. The method is based on the resolution of the plane contact problem according to the elasticity theory on the equilibrium of noncircular rings. Formulae for the determination of the boundary conditions, and of the normal radial and tangential stresses as generated by groundwater pressure in such tunnel casings are given. (Takacs-FIRL)
W75-01762

DETERMINATION OF CHANNEL CAPACITY OF THE SAN JOAQUIN RIVER DOWNSTREAM FROM THE MERCED RIVER, MERCED, STANISLAUS, AND SAN JOAQUIN COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
W75-01824

HYDRAULIC ANALYSIS OF FLOODFLOWS IN BUTTE BASIN AT STATE HIGHWAY 162, GLENN AND BUTTE COUNTIES, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
J. C. Blodgett, and P. L. Stiehr.
Open-file report 74-198, August 23, 1974. 48 p, 17 fig, 11 tab, 7 ref.

Descriptors: *Floods, *California, *Backwater, Bridges, Design flood, Flood frequency, Flood recurrence interval, Flood profiles.
Identifiers: *Butte Basin(Calif).

Inundation of California State Highway 162 across Butte Basin at Butte City results from overland floodflow from the Sacramento River and flooding on Butte Creek. Flooding of Butte Basin from the Sacramento River occurs whenever flow in the main channel at Butte City exceeds 90,000 cubic feet per second, a discharge with a recurrence interval of about 3 years. The distribution of floodflow across the basin is not uniform. During the flood of January 24, 1970, 84% of the total discharge resulted from overland flow from the Sacramento River and 16% from flooding on Butte Creek. The construction of bridges or culverts at two locations would increase the period of time that the road is usable. Analysis of the present roadway, bridge geometry, and ground elevations adjacent to the roadway indicates that backwater is less than 0.6 foot for flows of the magnitude experienced during the flood of January 24, 1970. The concurrent maximum velocity of flow at the bridges is 6.8 feet per second. Part of the backwater is caused by ground elevations adjacent to the roadway that are, at many locations, higher than the road crown. If the roadway embankment were raised to prevent overtopping without increasing the capacity or number of the bridges, backwater greater than 0.5 foot would result upstream from 6 of the 15 bridges on State Highway 162, and velocities would be excessive. Additional bridge openings to discharge a total of 37,800 cfs would be required for at least six locations if backwater and velocity were to be kept to levels similar to those observed for present conditions. (Knapp-USGS)
W75-01843

INCREASED LOGARITHMIC WEIR PROFILES,
Madras Univ., Guindy (India). Dept. of Hydraulics and Water Resources.
D. Chandrasekaran, and N. S. L. Rao.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 100, No HY11, Proceedings Paper 10946, p 1583-1599, November 1974. 7 fig, 2 tab, 15 ref, 2 append.

Descriptors: *Weirs, *Discharge coefficient, *Open channel flow, Flow measurement, Discharge(Water), Flow characteristics, Hydraulics, Equations.
Identifiers: *Logarithmic weirs, *Discharge-head relation.

The reverse problem of computing the shape of a weir profile for achieving an assumed discharge-head relation was solved. In a logarithmic weir, the discharge is proportional to the logarithm of the head measured from a certain datum. This weir needed a compensating bottom since its discharge-head relation involved a term of head which had less than 3/2 power. Different shapes of compensating bottoms as provided earlier in a linear proportional weir were also fitted for the logarithmic weir. The ranges of logarithmic weir profiles were increased to pass a design discharge under weir flow condition. This was achieved with the help of an arbitrary number introduced into the discharge-head relation. Experiments were conducted on two typical logarithmic weirs that yielded a value of 0.60 for the coefficient of discharge. (Bhowmik-ISWS)
W75-01985

TOTAL SEDIMENT DISCHARGE SAMPLING OVER SILLS,
Forest Service (USDA), Cadillac, Mich. North Central Forest Experiment Station.
For primary bibliographic entry see Field 2J.
W75-01986

VORTEX SUPPRESSION IN STILLING POND OVERFLOW,
Jyoti Ltd., Baroda (India).
For primary bibliographic entry see Field 5D.
W75-01994

TIDAL FLOW IN EXPONENTIALLY VARYING ESTUARIES,
Syracuse Univ., N.Y. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2L.
W75-01996

SEDIMENT TRANSPORT IN TIDAL RIVER,
Calcutta Port Commissioners (India).
For primary bibliographic entry see Field 2L.
W75-01997

HYDRAULICS OF CLOSED CONDUIT SPILLWAYS, PART XII: THE TWO-WAY DROP INLET WITH A FLAT BOTTOM,
Agricultural Research Service, Minneapolis, Minn.
C. A. Donnelly, G. G. Hebaus, and F. W. Blaisdell.
September 1974. 66 p, 30 fig, 5 tab, 6 ref. ARS-NC-14.

Descriptors: *Spillways, *Closed conduits, *Hydraulic design, *Design criteria, Pressures, Closed conduit flow, Siphons, Drop inlet, Inlets, Outlets, Vortices.

Results are presented of experiments on a rectangular drop inlet having a width equal to the barrel diameter, a flat bottom, and a flat, horizontal antivortex plate supported above the drop inlet crest by extensions of the drop inlet endwalls. This structure is called a two-way drop inlet because the water enters over only the two sides of the rectangular drop inlet. The experiments were conducted as a generalized study; that is, all dimensions are expressed in terms of the pipe diameter and the results are applicable to any size structure that is geometrically similar to the structure tested. Two separate apparatus were used to expedite the test program. In one, the test fluid was water; in the other, it was air. Inlet capacity, pipe priming, and vortex phenomena were studied using water. Entrance loss and pressure coefficients for various inlet proportions were studied using air, since full pipe flow tests can be conducted more advantageously with air than with water.
W75-02000

CONTROL OF COLUMN SEPARATION IN PUMPING MAINS,
Australian State Rivers and Water Supply Commission, Victoria, New South Wales.
For primary bibliographic entry see Field 8C.
W75-02167

8C. Hydraulic Machinery

RESTRAINING TUBE FOR SEWER ROD,
For primary bibliographic entry see Field 5D.
W75-01773

BOX FILTER,
Pall Corp., Glen Cove, N.Y. (assignee)
D. J. Rosenberg.

United States Patent 3,815,754. Issued June 11, 1974. Official Gazette of the United States Patent Office, Vol 923, No 2, p 551, June 11, 1974. 1 fig.

Descriptors: *Patents, *Filters, Equipment, Flow control.
Identifiers: *Box filters.

A disposable box filter is described which comprises a box housing in at least two portions, and has a fluid chamber with two fluid ports. A filter element in sheet form extends across the fluid chamber and is held at its sides by the housing across the line of flow between the fluid ports. (Sandoski-FIRL)
W75-01908

WIND, WATER AND WHEELS,
F. F. Blalock.
The Cattleman, p 70, 72, 74, May 1974.

Descriptors: *Winds, *Pumping, *Water delivery, *Hydraulic machinery, Livestock, Water consumption, Hardpan.
Identifiers: *Windmills.

When pioneers first moved into the Southwest, they experienced a problem still faced by people today, a lack of water for human consumption and for livestock. Although surface water was scarce, underground streams ran strong. In the 1880's, the windmill was introduced into Texas by cattlemen, and rapidly spread across the Southwestern plains as a dependable, economical, and mobile device to hoist water. The history and development of the windmill are described from the first wooden tower with wooden-bladed wheels, to the mass production of steel mills that reached its peak in 1929 with 100 manufacturers, to the present with 2 manufacturers of windmills which are still in demand not only for watering of livestock, but as a machine that costs nothing to run, produces energy, and emits no pollutants. (Mastic-Arizona)
W75-02059

APPARATUS FOR MONITORING WATER PURIFICATION SYSTEM,
For primary bibliographic entry see Field 3A.
W75-02141

APPARATUS AND METHOD FOR LARGE TUNNEL EXCAVATION IN SOFT AND INCOMPETENT ROCK OR GROUND,
Atomic Energy Commission, Washington, DC. (Assignee).
J. H. Altseimer, and R. J. Hanold.
US Patent Application Serial No 436,402, Filed January 25, 1974. 8 p, 5 fig.

Descriptors: *Patents, *Tunneling machines, *Rock excavation, Thermal stress, Nuclear reactors, Equipment.

A tunneling machine for producing large tunnels in soft rock or wet, clayey, unconsolidated or bouldery earth by simultaneously detaching the tunnel core by thermal melting a boundary kerf into the tunnel face and forming a supporting excavation wall liner by deflecting the molten materials against the excavation walls to provide, when solidified, a continuous wall supporting liner, and detaching the tunnel face circumscribed by the kerf with powered mechanical earth detachment means and in which the heat required for melting the kerf and liner material is provided by a compact nuclear reactor. (Sinha-OEIS)
W75-02163

APPARATUS AND METHOD FOR LARGE TUNNEL EXCAVATION IN HARD ROCK,
Atomic Energy Commission, Washington, DC. (Assignee).
J. H. Altseimer, and R. J. Hanold.
US Patent Application Serial No 436,401, Filed January 25, 1974. 10 p, 5 fig.

Descriptors: *Patents, *Tunneling machines, *Rock excavation, Thermal stress, Nuclear reactors, Equipment.

A tunneling machine for producing large tunnels in rock by progressive detachment of the tunnel core by thermal melting a boundary kerf into the tunnel face and simultaneously forming an initial tunnel wall support by deflecting the molten materials against the tunnel walls to provide, when solidified, a continuous liner; and fragmenting the tunnel core circumscribed by the kerf by thermal stress fracturing and in which the heat required for such operations is supplied by a compact nuclear reactor. (Sinha-OEIS)
W75-02164

CONTROL OF COLUMN SEPARATION IN PUMPING MAINS,
Australian State Rivers and Water Supply Commission, Victoria, New South Wales.
A. H. Brown.
In: Thermofluids Conference, 1974, Melbourne, The Institution of Engineers, Australia, Preprints of papers. p 10-14, 7 fig, 3 ref.

Descriptors: *Water hammer, *Pipelines, *Flow separation, Pipe flow, Valves, Pumping plants, Surges, Surge tanks, Hydraulic design, Cavitation.

Two pumping installations are described where water column separation occurs at some high points along the rising main subsequent to the failure of power to the pump motors. Without some form of protection the surges resulting from the rejoining of the water columns would be damaging to the pipelines. A non-return valve and a one-way surge tank are used to minimise the violence of the impact. Field measurements at the installations have been taken by means of a pressure-time recorder and it was found that generally, the pressures are less than the theoretical predictions. (CSIRO)
W75-02167

SOME ENVIRONMENTAL CONSIDERATIONS IN THE DESIGN AND CONSTRUCTION OF A LARGE HYDRO-ELECTRIC SCHEME,
Snowy Mountains Engineering Corp., Cooma (Australia). Hydrology Branch.
For primary bibliographic entry see Field 6G.
W75-02181

8D. Soil Mechanics

SUSPENDED- AND BEDLOAD-SEDIMENT TRANSPORT IN THE SNAKE AND CLEARWATER RIVERS IN THE VICINITY OF LEWISTON, IDAHO, JULY, 1973 THROUGH JULY, 1974,
Geological Survey, Boise, Idaho.
For primary bibliographic entry see Field 2J.
W75-01842

8E. Rock Mechanics and Geology

GEOLOGIC ENVIRONMENT OF THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
R. F. Yerkes, M. G. Bonilla, T. L. Youd, and J. D. Sims.
Circular 691-A, 1974. 35 p, 12 fig, 3 tab, 29 ref.

Descriptors: *Earthquakes, *Dams, *Reservoirs, *California, *Seismic design, Earthquake engineering, Seismic studies, Seismology, Vibrations, Faults(Geologic), Deformation.
Identifiers: *Van Norman Reservoirs(Calif).

The upper and lower Van Norman dams, in northwesternmost San Fernando Valley, California, were severely damaged during the 1971 San Fernando earthquake. An investigation of the geologic-seismologic setting of the Van Norman area indicates that an earthquake of at least M 7.7 may be expected. Transitory effects of such an earthquake are peak horizontal acceleration of at least 1.15 g, peak velocity of displacement of 4.43 ft/sec, peak displacement of 2.3 ft, and duration of shaking at accelerations greater than 0.05 g, 40 sec. A greater earthquake (M 8+) on the San Andreas fault, 25 mi distant, also is expectable. The permanent effects can include simultaneous fault movement at the lower damsite, the upper damsite, and the site proposed for a replacement dam halfway between the upper and lower dams. The 1971 San Fernando earthquake (M6-1/2) was accompanied by the most intense ground motions ever recorded. At the lower Van Norman dam, horizontal accelerations exceeded 0.6 g, and shaking greater than 0.25 g lasted for about 13 sec; at Pacoima dam, 6 mi northeast of the lower dam, high-frequency peak horizontal accelerations of 1.25 g were recorded in two directions, and shaking greater than 0.25 g lasted for about 7 sec. Permanent effects of the earthquake include slope failures in the embankments of the upper and lower Van Norman dams, rupturing of the ground surface, folding of the ground surface, and differential horizontal displacement. Because the Van Norman area overlooks the densely populated central San Fernando Valley, great conservatism is needed in the planning, design, and construction of dams. (Knapp-USGS)
W75-01846

EXPECTABLE EARTHQUAKES AND THEIR GROUND MOTIONS IN THE VAN NORMAN RESERVOIRS AREA,
Geological Survey, Reston, Va.
R. L. Wesson, R. A. Page, D. M. Boore, and R. F. Yerkes.
Geological Survey Circular 691-B, 1974. 9 p, 4 fig, 3 tab, 23 ref.

Descriptors: *Forecasting, *Earthquakes, *Dams, *Reservoirs, *California, *Seismic design, Earthquake engineering, Seismic studies, Seismology, Vibrations, Faults(Geologic), Deformation.
Identifiers: *Van Norman Reservoirs(Calif).

The Van Norman reservoirs complex, California, lies immediately upstream from a densely populated area. For this reason, the seismic stability of dams proposed for the complex should be analyzed on the basis of the worst seismic hazard that can reasonably be expected to affect the area. Accelerograms used in dynamic analyses to predict the response of the dam structures to earthquake loading should be chosen to (1) model the maximum expectable earthquakes from the tectonic province in which the dam is located and (2) adequately represent the ground motions expected at the damsites from those earthquakes. Two earthquakes are considered: a great earthquake in excess of M 8 on the San Andreas fault some 40 km northeast of the reservoirs area and a local earthquake of M 7 1/2-7 3/4 along the Sierra Madre-San Fernando-Santa Susana system of faults, within which the reservoirs area is located. Basic parameters are suggested for the selection of accelerograms to model these two earthquakes, including suggested values for the peak horizontal acceleration, velocity, dynamic displacement, and duration. (Knapp-USGS)
W75-01847

8F. Concrete

CHEMICAL CORROSION OF CONCRETE,
Humes Ltd., Melbourne (Australia).
C. A. Baker.
Australasian Corrosion Engineering, Vol 18, No 9, p 19-26, September 1974. 1 fig, 3 tab, appendix.

Descriptors: *Concrete pipes, *Concrete testing, *Chemical degradation, *Corrosion control, *Reviews, Concrete additives, Concretes, Coatings, Linings, *Hydrogen sulphide, Sulfur bacteria, Sulfur compounds, Sewers, Sewage, Sewage bacteria.

A review is presented of the reasons for the susceptibility of concrete to chemical attack, and the types of chemical change experienced. Particular attention is given to the problem of H2S attack in concrete sewer systems, in which sulfur compounds in the sewage are microbially reduced to sulphides, released as H2S, and then oxidised to sulfuric acid by bacteria on the concrete surface. The process is most likely to occur with stale sewage at high temperatures moving slowly in poorly ventilated systems. Proper design can reduce the risk of this combination of factors, but in some cases it is more economical to allow the H2S production and protect the concrete surface. Results are presented of a series of tests over 12 years to evaluate concrete admixtures, coating and lining materials for resistance to H2S corrosion. (CSIRO)
W75-02169

TEST METHODS FOR CONCRETE DURABILITY,
Rocla Concrete Pipes, Ltd, Melbourne (Australia). Research Centre.
A. P. Jones.
Australasian Corrosion Engineering, Vol 18, No 9, p 5-12, September 1974. 1 tab, 13 ref.

Descriptors: *Concrete testing, *Reviews, *Australia, *Standards, Portland cements, Aggregates, Alkali-aggregate reactions, Materials testing.

Comments are given on the purpose and significance of some of the more common tests on Portland cements, dense aggregates and concrete. The Australian Standards recommended test certificate classifies cements into ordinary, high early strength, low heat of hydration, and sulphate-resisting types. Agregates are tested for crushing value, clay lumps, fine materials, organic impurities, potential alkali-aggregate reactivity and soundness. Tests described for concrete are air space, density, absorption, permeability to water, freeze-thaw tests, and resistance to wear. (CSIRO)
W75-02171

PHYSICAL CORROSION OF CONCRETE,
Victorian State Rivers and Water Supply Commission, Melbourne (Australia).
F. L. Burns.
Australasian Corrosion Engineering, Vol 18, No 9, p 13-17, September 1974. 4 fig, 3 ref.

Descriptors: *Reviews, *Corrosion, *Concrete construction, *Cracks, Concrete technology, Construction joints, Contraction joints, Expansion joints, Thermal properties, Shrinkage, Settlement(Structural), Repairing, Abrasion, Erosion, Cavitation.

The major physical disintegrating processes which may occur in concrete structures are reviewed, with particular reference to cracking. Cracks are considered in two classes: stationary, such as shrinkage, settlement and some types of temperature cracks; and moving, such as structural cracks and those due to fluctuating service temperatures. Design, formulation and construction methods for their prevention are described, and some notes on repair methods are given. Abrasion, erosion and cavitation are treated more briefly. (CSIRO)
W75-02174

STUDIES OF THE DEFORMATION AND CRACKING CHARACTERISTICS OF SYDNEY CONCRETES UNDER SITE CONDITIONS,
Sydney Univ. (Australia). Dept. of Civil Engineering.
H. Roper.
Civil Engineering Transactions, The Institute of Engineers Australia, Vol CE16, No 2, p 179-185, 1974. 13 fig, 6 tab, 8 ref.

Descriptors: *Aggregates, *Concrete testing, *On-site tests, Cements, Concrete technology, Concretes, Cracks, Shrinkage, Laboratory tests, Concrete mixes.
Identifiers: Sydney(N.S.W.), Breccias.

Field and laboratory studies on concretes made with aggregates and cements locally available in the Sydney area demonstrate significant differences in some of their characteristics. By comparison with concretes made from crushed river gravel, those made with breccia aggregates had a high tendency to cracking and shrinkage. The use of low shrink cements is not a cure for the excessive shrinkage associated with breccias. The laboratory data were found to have definite application under field conditions. (CSIRO)
W75-02175

8G. Materials

STATIC CALCULATION OF SEWAGE PIPES MADE FROM HIGH-PRESSURE POLYETHYLENE (STATISCHE BERECHNUNG VON ABWASSERROHREN AUS POLYAETHYLAN),
For primary bibliographic entry see Field 8B.
W75-01745

NEW DESIGNS OF PIPELAYING IMPLEMENTS FOR DRAIN BAGGERS (NOVYYE KONSTRUKTSII TRUBOUKLADYVAYUSHCHIKH PRISPOSOBLENIY DRENOUKLADCHIKOV),
For primary bibliographic entry see Field 8A.
W75-01746

CORNWALL'S NEW PVC TRUNK MAIN,
Chemidus Wavin Ltd., Durham (England).
For primary bibliographic entry see Field 5F.
W75-01769

WASTE PLANT CORROSION MUST BE TREATED WITH CARE,
Carboline Co., St. Louis, Mo. Pollution Control Div.
For primary bibliographic entry see Field 5D.
W75-01867

PLASTIC-MEDIUM TRICKLING FILTERS FOR BIOLOGICAL NITROGEN CONTROL,
Dow Chemical Company, Midland, Mich. Environmental Control Systems.
For primary bibliographic entry see Field 5D.
W75-01920

MATERIALS FOR WET OXIDATION PROCESSING EQUIPMENT (SHIPBOARD),
National Materials Advisory Board (NAS-NAE), Washington, D.C.
Available from the National Technical Information Service, Springfield, Va. 22161 as AD-771 745, $4.75 in paper copy, $2.25 in microfiche. November, 1973. 75 p, 5 fig, 7 tab, 12 ref.

Descriptors: *Oxidation, Equipment, *Processing, Ships, *Corrosion, Acidity, Wastes, Installation, Temperature, *Titanium, Design criteria, Construction materials, Monitoring, Reviews, Waste water treatment.
Identifiers: *Wet oxidation, Tantalum, Palladium, Carbon steel.

Since the wet oxidation process requires the containment of corrosive products (the material being processed can range from very acidic to slightly basic and over a broad spectrum of wastes), at elevated temperatures and pressures, difficult but solvable materials-of-construction problems occur. Wet oxidation systems can be constructed from commercially pure titanium as well as from titanium alloyed with palladium (.12-.25 percent). This type of system can be operated safely at approximately 500 F with reasonable assurance of moderate life (approximately 10 years). A tantalum-lined and coated titanium system provides the longest life of materials. For higher temperature operation up to 600 F and a projected equipment life of 15 years, a ceramic-lined and coated carbon steel or titanium system would have to be developed. An added advantage to ceramic lining is improved heat insulation, allowing for a reduction of external insulation. In addition, a penetration monitoring system can be incorporated in the ceramic lining. The wet oxidation process can be operated in a continuous manner in shipboard installations. The reaction vessel can consist of a piping array configuration. (Prague-FIRL)
W75-01924

SCLAIRPIPE REPLACES OLD WATER LINE FAST.
For primary bibliographic entry see Field 3E.
W75-02019

CONTROL OF DEPOSIT FORMATION AND RELATED PROBLEMS IN THE BLEACH PLANT AND PULP MILL.
Betz Labs., Inc., Trerose, Pa.
For primary bibliographic entry see Field 3E.
W75-02035

CHEMICAL CORROSION OF CONCRETE,
Humes Ltd., Melbourne (Australia).
For primary bibliographic entry see Field 8F.
W75-02169

PHYSICAL CORROSION OF CONCRETE,
Victorian State Rivers and Water Supply Commission, Melbourne (Australia).
For primary bibliographic entry see Field 8F.
W75-02174

8H. Rapid Excavation

APPARATUS AND METHOD FOR LARGE TUNNEL EXCAVATION IN SOFT AND INCOMPETENT ROCK OR GROUND,
Atomic Energy Commission, Washington, DC. (Assignee).
For primary bibliographic entry see Field 8C.
W75-02163

APPARATUS AND METHOD FOR LARGE TUNNEL EXCAVATION IN HARD ROCK,
Atomic Energy Commission, Washington, DC. (Assignee).
For primary bibliographic entry see Field 8C.
W75-02164

8I. Fisheries Engineering

REGIONAL MANAGEMENT OF FISHERY RESOURCES,
Georgia Dept. of Natural Resources, Brunswick. Game and Fish Div.
For primary bibliographic entry see Field 6E.
W75-01788

10. SCIENTIFIC AND TECHNICAL INFORMATION

10B. Reference and Retrieval

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, CENTRAL REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-02116

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, WESTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-02117

INDEX TO WATER-QUALITY DATA AVAILABLE FROM THE U.S. GEOLOGICAL SURVEY IN MACHINE-READABLE FORM TO DECEMBER 31, 1972, SOUTHEASTERN REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W75-02118

10C. Secondary Publication And Distribution

BIBLIOGRAPHY ON THE 160-ACRE ANTI-MONOPOLY WATER LAW,
For primary bibliographic entry see Field 6E.
W75-01702

LAW BOOKS RECOMMENDED FOR LIBRARIES, NO 38, WATER LAW, SUPPLEMENT.
Association of American Law Schools, Washington, D.C.
For primary bibliographic entry see Field 6E.
W75-01710

MINIMIZING VARIABILITIES IN INDEXING,
Arizona Univ., Tucson. Office of Arid Lands Studies.
L. White.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-237 989, $4.25 in paper copy, $2.25 in microfiche. Research Report, November 1973. 50 p, 41 ref. (Appendix A--Indexing Policy for the Watershed Management Information System).

Descriptors: *Indexing, *Documentation, *Reviews, *Information exchange, Classification, Data storage and retrieval, Information retrieval, Publications, Technical writing.
Identifiers: *Watershed Management Information System.

Studies on indexing were reviewed to discover what factors influence indexing and to determine whether indexing quality would be improved by a written policy. It was found that there are no absolute rules on determining how specific an indexing term should be. Instead, the amount of specificity depends entirely on the nature of the article. A technical report usually contains a title, an abstract, and introduction including historical and theoretical support for the work, a description of methodology and materials used, a discussion, results, illustrative material, conclusions, a summary, an index sometimes, and references. The sections of particular importance to an indexer are the introduction, summary and conclusions, results, and methodology. If an indexer is working from an abstract only, all parts of the abstract should be studied carefully. Application of the indexing process was shown by two examples. (Scott-ISWS)
W75-01960

HEATED EFFLUENTS AND EFFECTS ON AQUATIC LIFE WITH EMPHASIS ON FISHES, A BIBLIOGRAPHY,
Ichthyological Associates, Ithaca, N.Y.
For primary bibliographic entry see Field 5C.
W75-02004

CADMIUM IN THE ENVIRONMENT: AN ANNOTATED BIBLIOGRAPHY,
Oak Ridge National Lab., Tenn. Environmental Information Systems Office.
For primary bibliographic entry see Field 5B.
W75-02102

10F. Preparation Of Reviews

IDENTIFICATION AND BIOTRANSFORMATION OF ORGANOMERCURIAL COMPOUNDS IN LIVING SYSTEMS, A REVIEW OF CURRENT UNDERSTANDING,
Health and Welfare Canada, Ottawa (Ontario). Health Protection Branch.
For primary bibliographic entry see Field 5B.
W75-01673

INCIDENCE AND SIGNIFICANCE OF POLYNUCLEAR AROMATIC HYDROCARBONS IN THE WATER ENVIRONMENT,
Pittsburgh Univ., Pa. Graduate School of Public Health.
For primary bibliographic entry see Field 5A.
W75-01885

PURIFICATION WITH ACTIVATED CARBON: INDUSTRIAL, COMMERCIAL, ENVIRONMENTAL,
For primary bibliographic entry see Field 5D.
W75-02027

DESERT PLANT CHEMURGY: A CURRENT REVIEW,
Agricultural Research Service, Weslaco, Tex. Foods Crops Utilization Research Lab.
For primary bibliographic entry see Field 2I.
W75-02053

NUTRITIONAL INFLUENCES ON THE TOXICITY OF ENVIRONMENTAL POLLUTANTS,
Environmental Health Consultation Service, Ojai, Calif.
For primary bibliographic entry see Field 5C.
W75-02068

RECENT DEVELOPMENTS IN THE ANALYSIS OF TOXIC ELEMENTS,
Cornell Univ., Ithaca, N.Y. Pesticide Residue Lab.
For primary bibliographic entry see Field 5A.
W75-02114

A TECHNICAL AND ECONOMIC REVIEW OF WATER HARVESTING METHODS,
Western Australia University, Nedlands (Australia). Dept. of Civil Engineering.
For primary bibliographic entry see Field 03B.
W75-02178

SUBJECT INDEX

1972 FEDERAL WATER POLLUTION CONTROL ACT
Accomodating to New Imperatives in Water Pollution Control,
W75-01942 5G

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W75-02128 5B

ACTIVATED CARBON
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W75-01834 5G

Removal of Phenols from Polluted Waters,
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Purification with Activated Carbon: Industrial, Commercial, Environmental,
W75-02027 5D

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W75-01759 5D

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W75-01771 5D

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W75-01916 5D

Thickening and Dewatering Characteristics of Kraft Mill Sludges from a High-Purity Oxygen Treatment System,
W75-02022 5D

Waste Water Purification Measures at the Biberist Paper Mill (Abwassersanierungsmassnahmen der Papierfabrik Biberist),
W75-02029 5D

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W75-02187 4D

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W75-01713 6E

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W75-01714 6E

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W75-01750 5D

Air Diffusion Unit,
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AGP Test on Community Sewage: III. Stockholm's Chemical Treatment Plants, 1972, (In Swedish),
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CENTERS OF COMPETENCE AND THEIR SUBJECT COVERAGE

- Ground and surface water hydrology at the Illinois State Water Survey and the Water Resources Division of the U.S. Geological Survey, U.S. Department of the Interior.
- Metropolitan water resources planning and management at the Center for Urban and Regional Studies of University of North Carolina.
- Eastern United States water law at the College of Law of the University of Florida.
- Policy models of water resources systems at the Department of Water Resources Engineering of Cornell University.
- Water resources economics at the Water Resources Center of the University of Wisconsin.
- Eutrophication at the Water Resources Center of the University of Wisconsin.
- Water resources of arid lands at the Office of Arid Lands Studies of the University of Arizona.
- Water well construction technology at the National Water Well Association.
- Water-related aspects of nuclear radiation and safety at the Oak Ridge National Laboratory.
- Water resource aspects of the pulp and paper industry at the Institute of Paper Chemistry.

Supported by the Environmental Protection Agency in cooperation with WRSIC

- Effect on water quality of irrigation return flows at the Department of Agricultural Engineering of Colorado State University.
- Agricultural livestock waste at East Central State College, Oklahoma.
- Municipal wastewater treatment technology at the Franklin Institute Research Laboratories.

Subject Fields

1 NATURE OF WATER

2 WATER CYCLE

3 WATER SUPPLY AUGMENTATION AND CONSERVATION

4 WATER QUANTITY MANAGEMENT AND CONTROL

5 WATER QUALITY MANAGEMENT AND PROTECTION

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